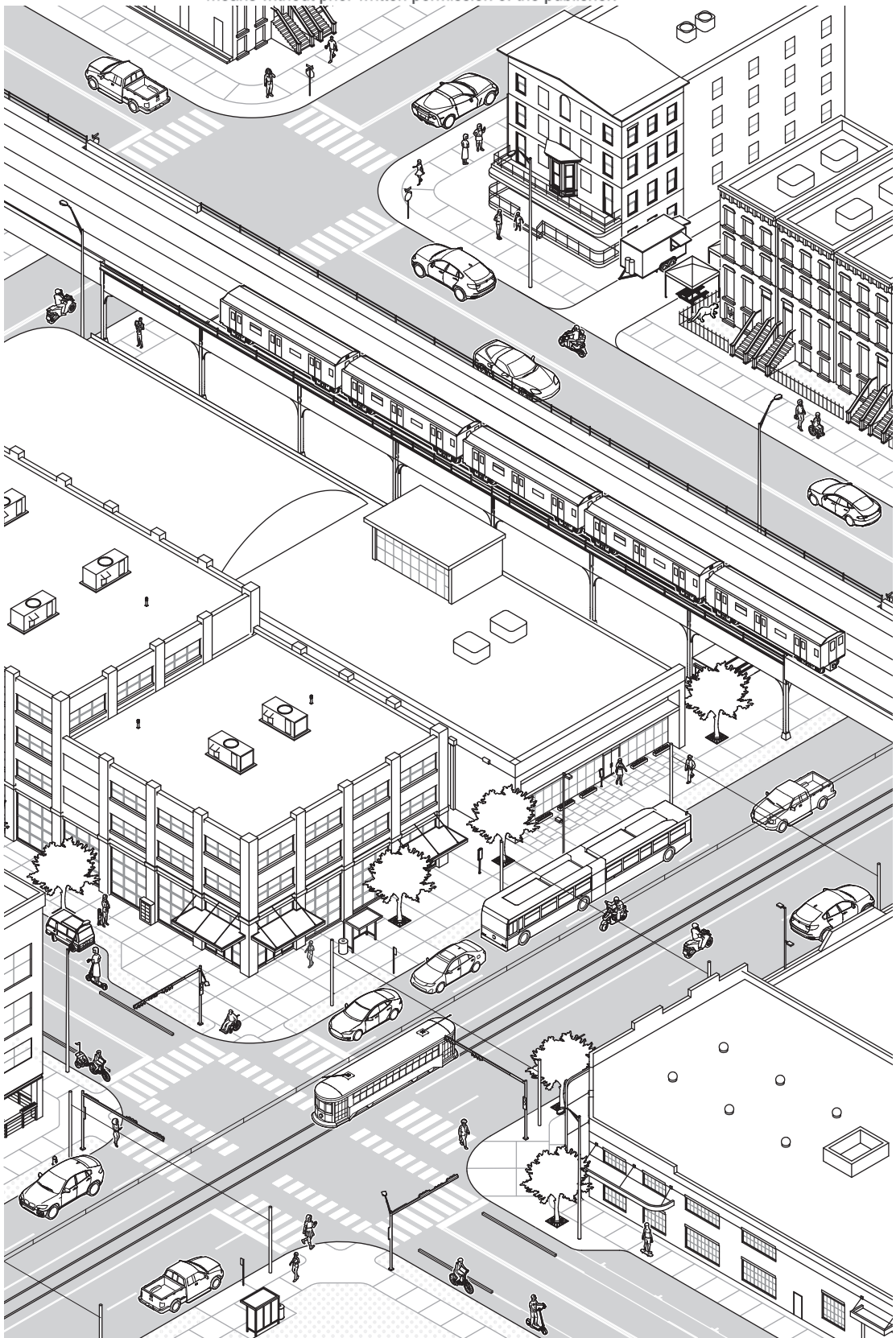


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INTRODUCTION





Cities Are the Greatest Human Invention

People have been living in cities for five thousand years. Since their beginning, cities have served one essential function: bringing people together. When people gather, they can exchange ideas, organize governments, and trade goods. Cities are the cradles of culture, economies, invention, and religion. All that can happen because people can meet other people, either intentionally or by chance encounter.

Movement is fundamental to cities. Cities depend on far-flung networks to bring people and goods there. Rome would not have been the heart of an empire if not for a network of roads and sea routes stretching to the Rhine, Iberia, North Africa, and the Middle East. People need to move within cities, too, from where they live to where they work, where they shop, where they meet, where they worship, and where they have fun.

It is easy to see a city as a collection of buildings, but what comes between the buildings is every bit as important. A city is made possible by its streets, sidewalks, bike paths, bus routes, and rail lines. There would be no Cheyenne, Wyoming, without the transcontinental railroad, and there would be no Manhattan skyline without the subways that bring commuters there.

Transportation not only enables cities, but it shapes them. Cities grow around transportation networks. The structures of road networks and the locations of rail lines set where buildings will go. After that, we have to fit transportation networks into existing cities. Every form of transportation has its inherent geometry. As transportation has evolved, so has the shape of cities.

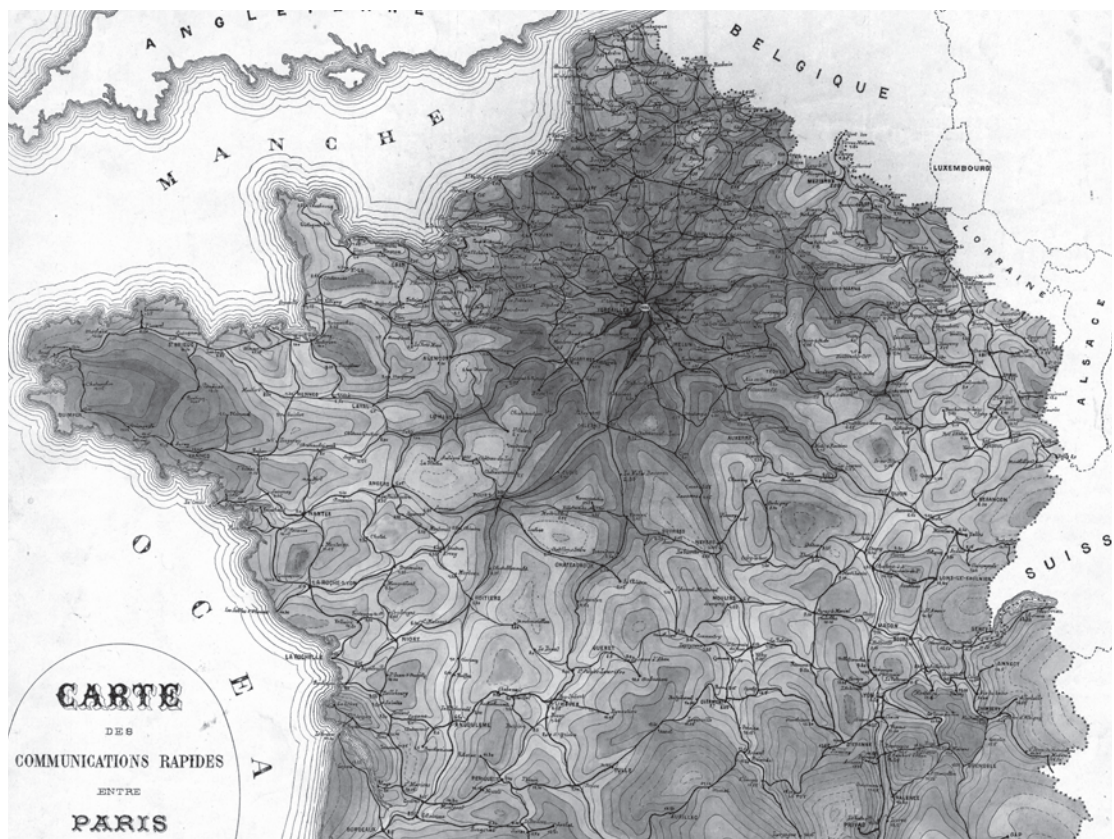
Transportation Exists to Provide Access

We often talk about transportation as *mobility*, but our primary goal in using transportation is not to move; rather, it is to get somewhere. The more places that transportation gets us to, the more useful it is to us.

Everybody has a certain amount of time they are willing to travel to do something. That will vary dramatically for different things—people will obviously travel much longer to see their favorite band than to get a coffee—but it is effectively a limit on what we can access. Typically, people throughout history have been willing to commute about half an hour to get to work (a time known as *Marchetti's constant*).

Thus, if we want to measure the usefulness of transportation, we can measure access: How many of the things we want to do (get to work, go to school, shop, see friends) can we reach in half an hour?

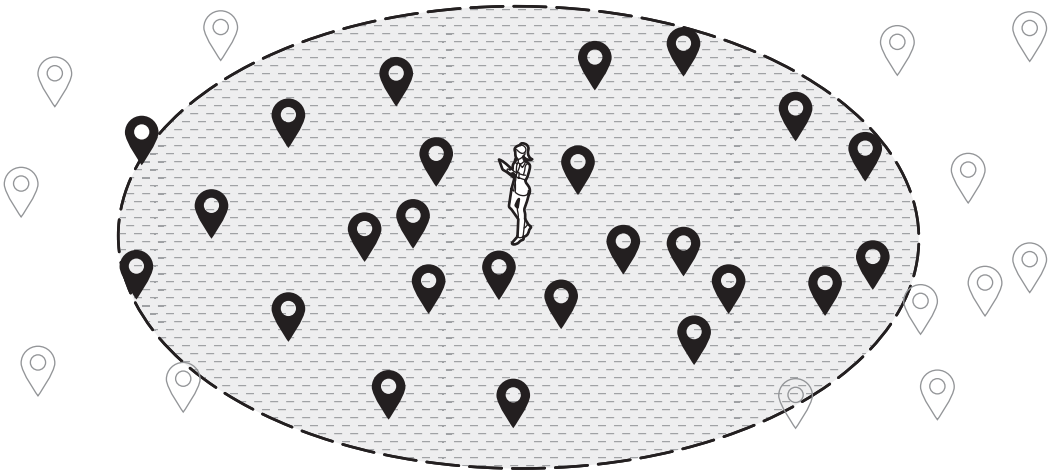
There are two ways to increase access: We can increase travel speed, or we can increase the density of the destinations. Both ways can be effective. New York City is a low-speed, high-density metropolis. Manhattan is one of the slowest places to travel in, regardless of mode, but it is so full of destinations that it offers extraordinary access. Houston, on the other hand, is a high-speed, low-density city. Things are far apart, but freeways allow people to travel fast.



Maps that show travel distance by time are called *isochrones*. This version, by E. Martin and E. Chevallie, is from France in the 1880s and showcases how the country's rail system had made travel much quicker than previous modes of travel. (The University of Chicago Map Collection.)






In the center, there is a person; the markers are all the things that a person wants to get to: school, work, restaurants, shows, and friends to visit. The gray area is how far that person can go in a reasonable amount of time. Thus, the person has access to the black markers and not to the gray ones.



Increasing speed increases access by making the area we can reach bigger.



Increasing density increases access by putting more destinations in the area we can reach.

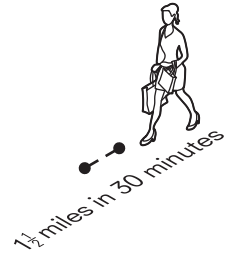
-  Accessible destinations
-  Inaccessible destinations
-  Accessible area

Throughout History, Faster Transportation Has Increased Access

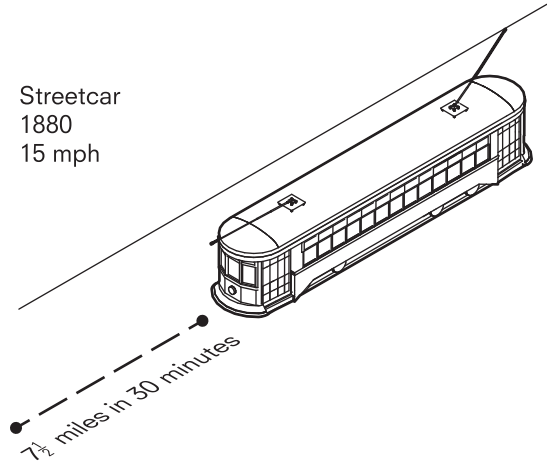
For most of the history of cities, people got around on foot. Although wealthier people rode on horseback and some goods moved by oxcart or llama, nearly everyone walked everywhere. That created a limit to the physical size of cities: a half-hour's walk is a mile and a half, so a city more than three miles wide no longer has a single hub that all the population can easily reach.

The invention and adoption of motorized transportation—first the electric streetcar in the 1880s, then the car in the 1910s—dramatically increased how fast we can move in cities. Instead of 3 miles per hour (mph), we now travel at 30 mph or more. That means we can reach more than one hundred times the area in 30 minutes, and it has allowed cities to grow dramatically.

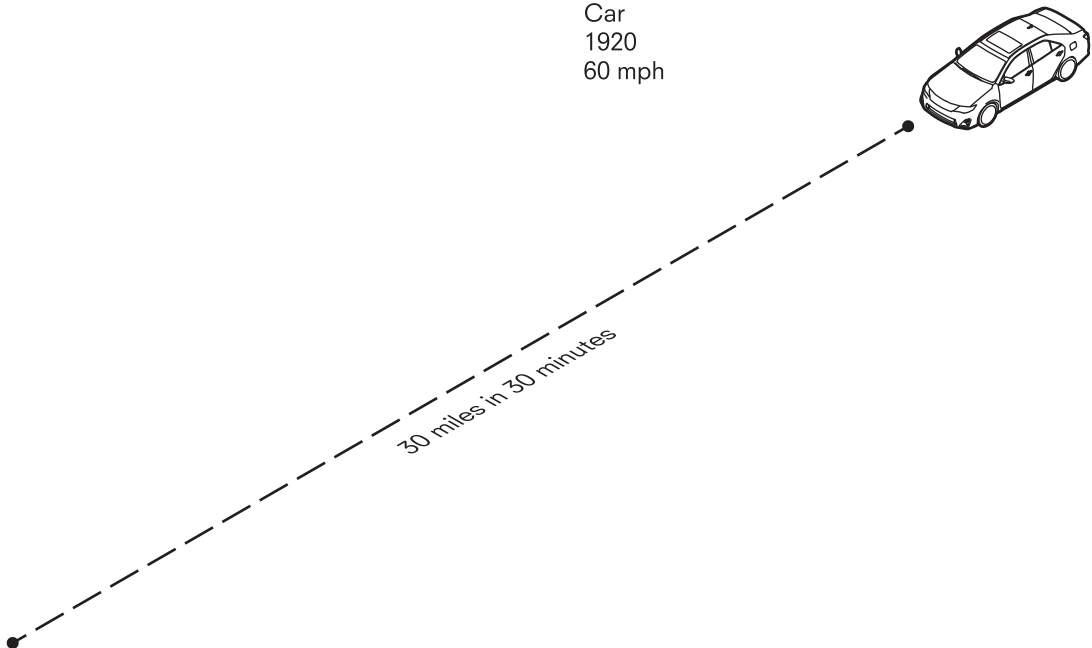
Walking
10,000 BC
3 mph



Streetcar
1880
15 mph

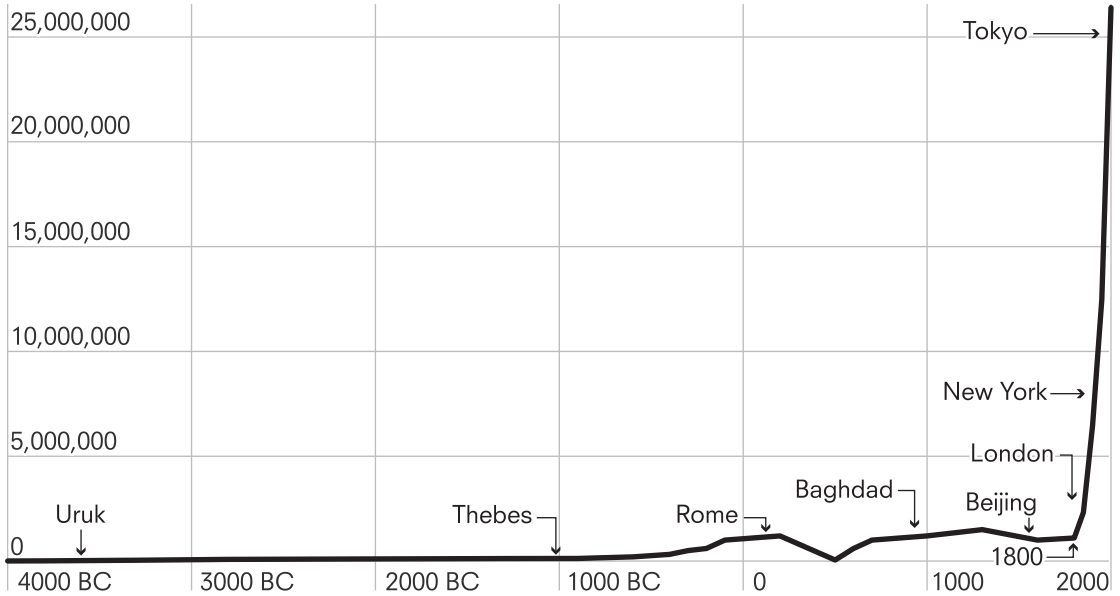


Car
1920
60 mph



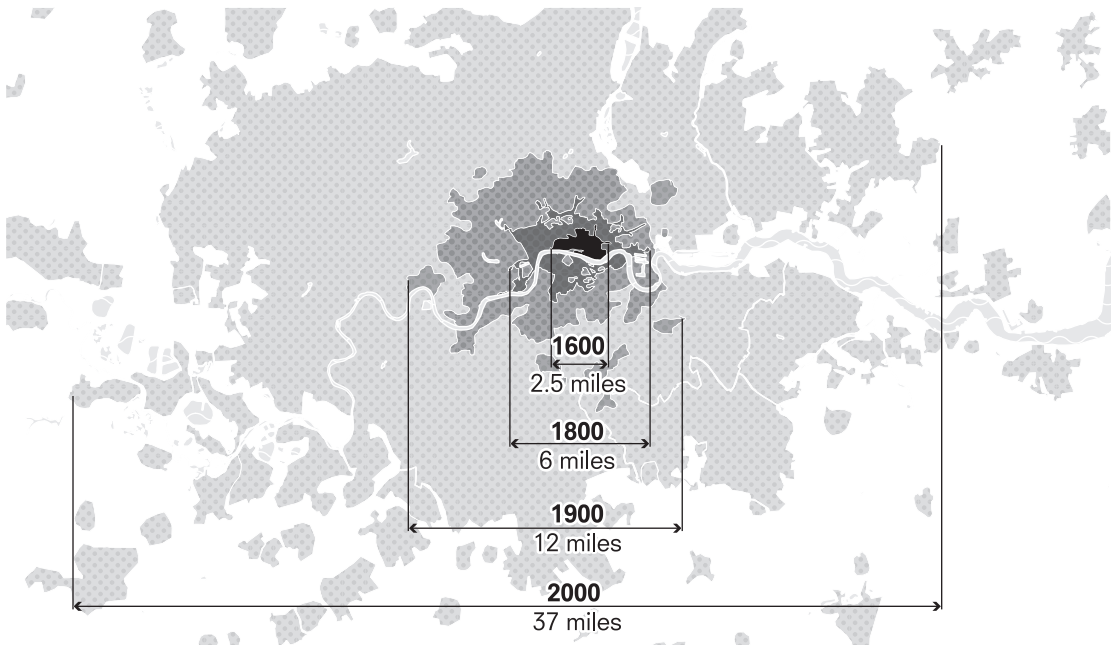
World's Largest City

Population



Over time, different cities were the world's largest: Uruk in what is now Iraq; Thebes in Egypt; Rome, Italy; Baghdad, Iraq; and Beijing, China. However, until the 1800s, the maximum size of a city was limited by walking speed. The growth of London (below) shows how dramatically bigger urban areas became with motorized transport.

London

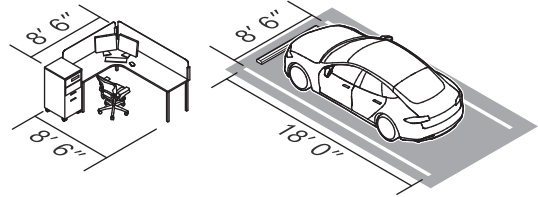


But Faster Speed Requires More Space

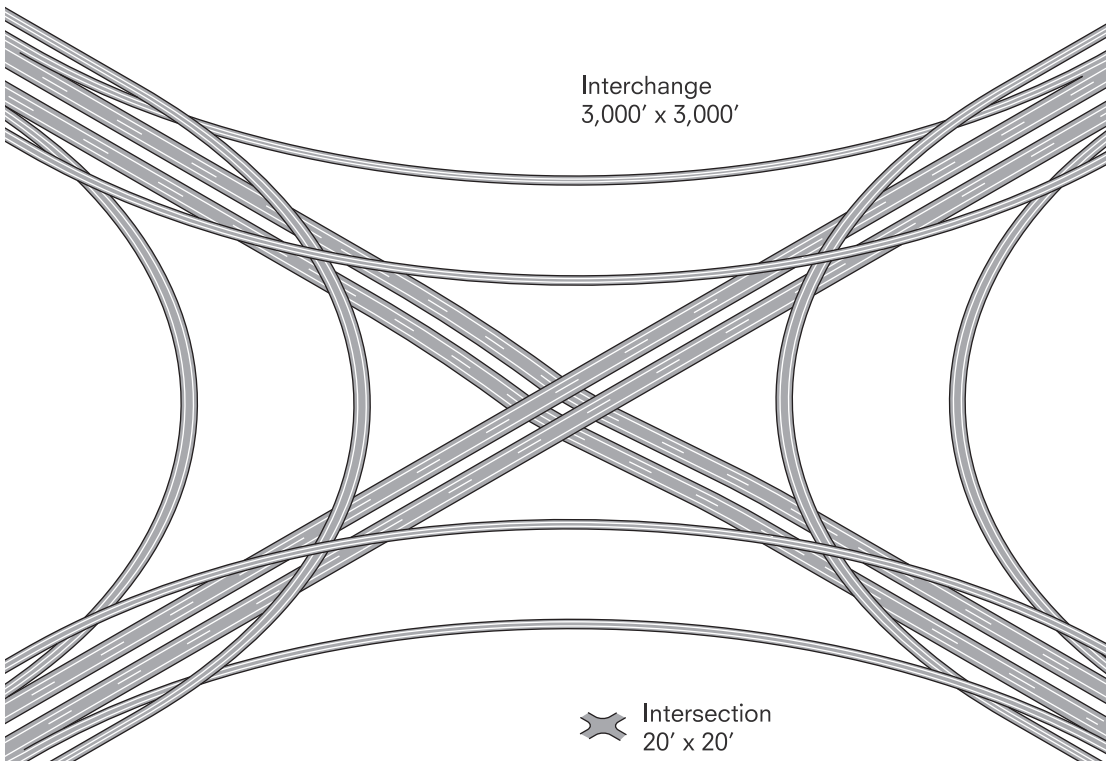
The faster we travel, the more space we need because the vehicles we use are larger: A car is bigger than a pedestrian, and a high-speed train is bigger than a car. (That train carries far more people than a car, so it is more efficient in the space it requires per person, but it nevertheless requires a station the size of several city blocks.) It is also true that speed increases the room needed to maneuver. A person walking can make a 90-degree turn in $2\frac{1}{2}$ feet. A bicyclist needs 8 feet, and a car needs 21 feet. But if the car is going 35 mph, it needs 350 feet, and if it is going 65 mph, it needs nearly 1,500 feet.

As transportation goes faster, there is less room for buildings, streets need to be wider, and junctions need to get much

bigger. That makes the surrounding city less dense. That is why there are high-density, low-speed, and high-speed, low-density cities but not high-speed, high-density cities.



Even when cars are not moving, they need ample space: a typical office worker has less workspace allocated to them in their cubicle than their car has allocated to it in the parking garage.

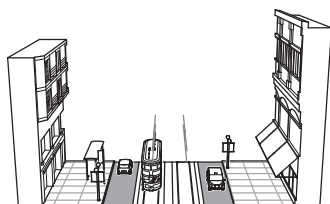


If we are designing only for pedestrians moving at full speed, an intersection needs to be 20 feet by 20 feet. However, if we are designing an intersection for cars moving at 65 mph, we need an interchange 3,000 feet long in both directions.



Walking city

The famous Nolli map of Rome (1748) shows the typical form of a walking city. The cities of the Incas or the hutongs of Beijing took on similar forms. Streets only needed to fit pedestrians and the con-cessional cart, so they could be narrow: 20 feet for side streets, maybe 40 feet for main streets. The result was densely packed cities. The streets appeared to be carved out of a solid mass of buildings.

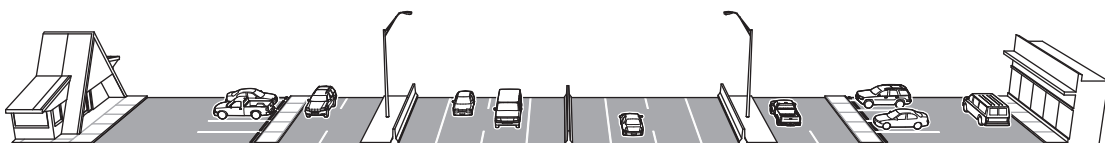


Streetcar city

As streetcars were introduced, wider streets were needed. The typical US downtown of the 1920s had 60- to 100-foot-wide streets. In European cities, these streets were sometimes carved into existing cities by demolition. Side streets, though, could still be smaller. Victorian London shows this pattern: wider main streets for streetcar lines with narrower side streets. Railroads required a bigger scale, and stations a thousand feet long or more were added to the urban fabric.



Following the adoption of the Federal-Aid Highway Act of 1956, the major arteries of a car-based city—freeways—were designed to be several hundred feet wide. Even minor side streets today are typically at least 50 feet wide, and major arterials are 80 to 100 feet wide. Outside of the streets, parking takes up a quarter to half of the lot area. Wide streets and surface parking change the urban form: Rather than being surrounded by a mass of buildings, buildings float in an open space of streets and surface parking lots.



Car-based city

For all modes of transportation, the turn radii go up dramatically with speed.

200 mph



125 mph



65 mph



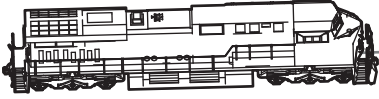
$R = 350' \times 50$ scale on facing page

35 mph



$R = 350'$

Absolute minimum



$R = 300'$

25 mph

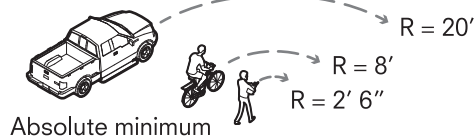


$R = 150'$

15 mph



$R = 60'$



To Build New Transportation Infrastructure, We Have to Make Space

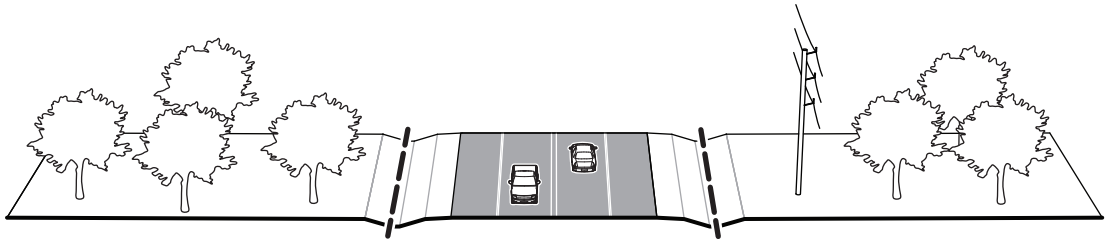
New cities and neighborhoods can be built around the transportation that will serve them. But the hearts of our metropolitan areas are places that have been lived in for hundreds or thousands of years. The biggest challenge is adapting those places for new transportation infrastructure to move more people, move people faster, or move people more safely.

There are three basic ways to make space for new transportation modes or added capacity in a city: Demolish buildings to make room, build over or build under, or reallocate space.

Designing transportation is always a problem of geometry: If we want to add something new, we need space for it. Finding space is never easy—it is a design problem requiring thoughtful planners, engineers, landscape architects, urban designers, and policy-makers. It also raises the fundamental question of whether the new infrastructure is worth its cost and impacts on the city. Historically, the decisions about reallocating space have negatively impacted people without power and means.

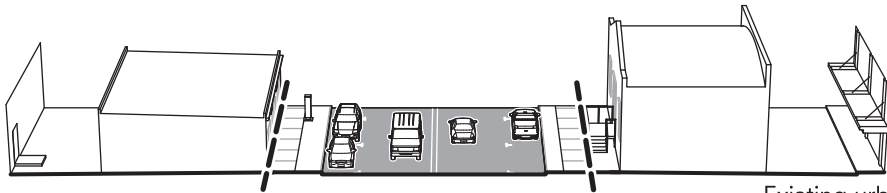


State Route 110 was bulldozed through neighborhoods at the edge of downtown Los Angeles in 1953. (UCLA Geography Aerial Archives.)

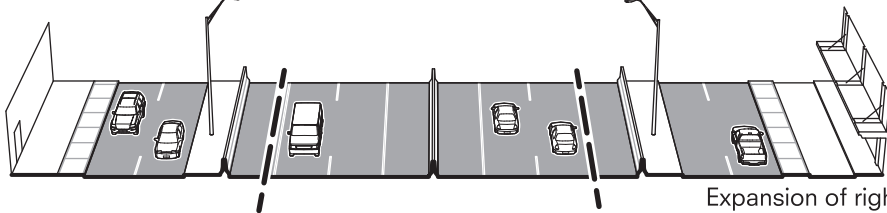


Greenfield (previously undeveloped land)

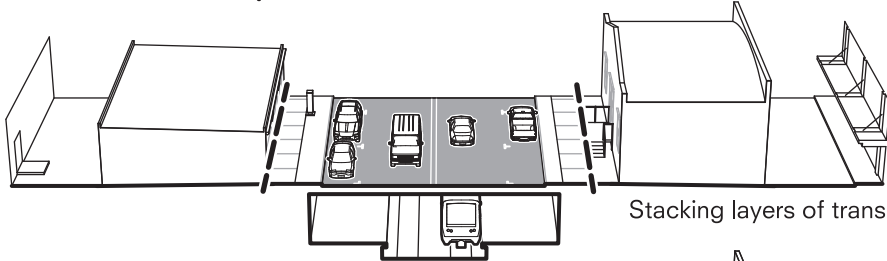
The easiest place to build new infrastructure is on undeveloped land. That is how cities often grow. But greenfield development increases how far people have to travel, increases the overall amount and cost of infrastructure, increases harmful carbon emissions, and displaces natural habitat.



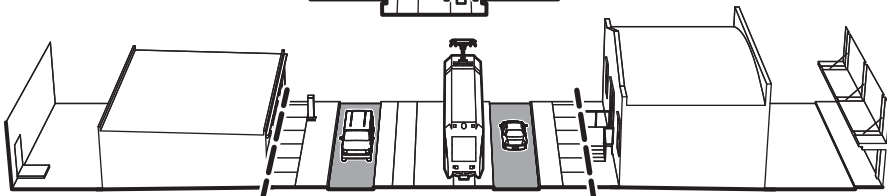
Existing urban street



Expansion of right-of-way



Stacking layers of transportation



Reallocating space

We can make room for new infrastructure with demolition. Governments have the power to buy homes and businesses through eminent domain and frequently do. Many of the busiest segments of the US Interstate Highway network were built through existing neighborhoods. Street widening and new transit lines may require strips of property on the sides of an existing street. But these changes often displace people, destroy neighborhoods, and disrupt the urban fabric.

We can add new layers to the city by grade separating. We can build rail or highways under the city or build elevated structures above streets. This type of

change can minimize impacts on the city, but it also costs a lot.

Finally, we can reallocate space. Typically, a quarter to a third of our cities are made up of public land, primarily street rights-of-way. Using that space differently is often the least expensive and least intrusive way to fit new things. In the 1940s and 1950s, many cities narrowed sidewalks to make room for more traffic lanes. Today, some of those same cities are converting those traffic lanes to bike or transit lanes. These changes always come with trade-offs and the resulting political battles, however.

All the Infrastructure We Build Has Impacts

Most transportation projects will last for decades, and their effects will last even longer—there are cities located where they are today because of roads built two thousand years ago. This is exactly what we want: We build transportation projects to change the world, whether in little ways or big ways.

Alongside the positive changes, though, are negative impacts. Transportation brings noise and pollution. It takes space that was already something else—wildlife habitat, homes, or other transportation modes. The very features that make a new transportation connection fast and reliable—grade separation, broad curves, limited access, and traffic priority—can also disrupt other transportation connections, making trips slower or less reliable.

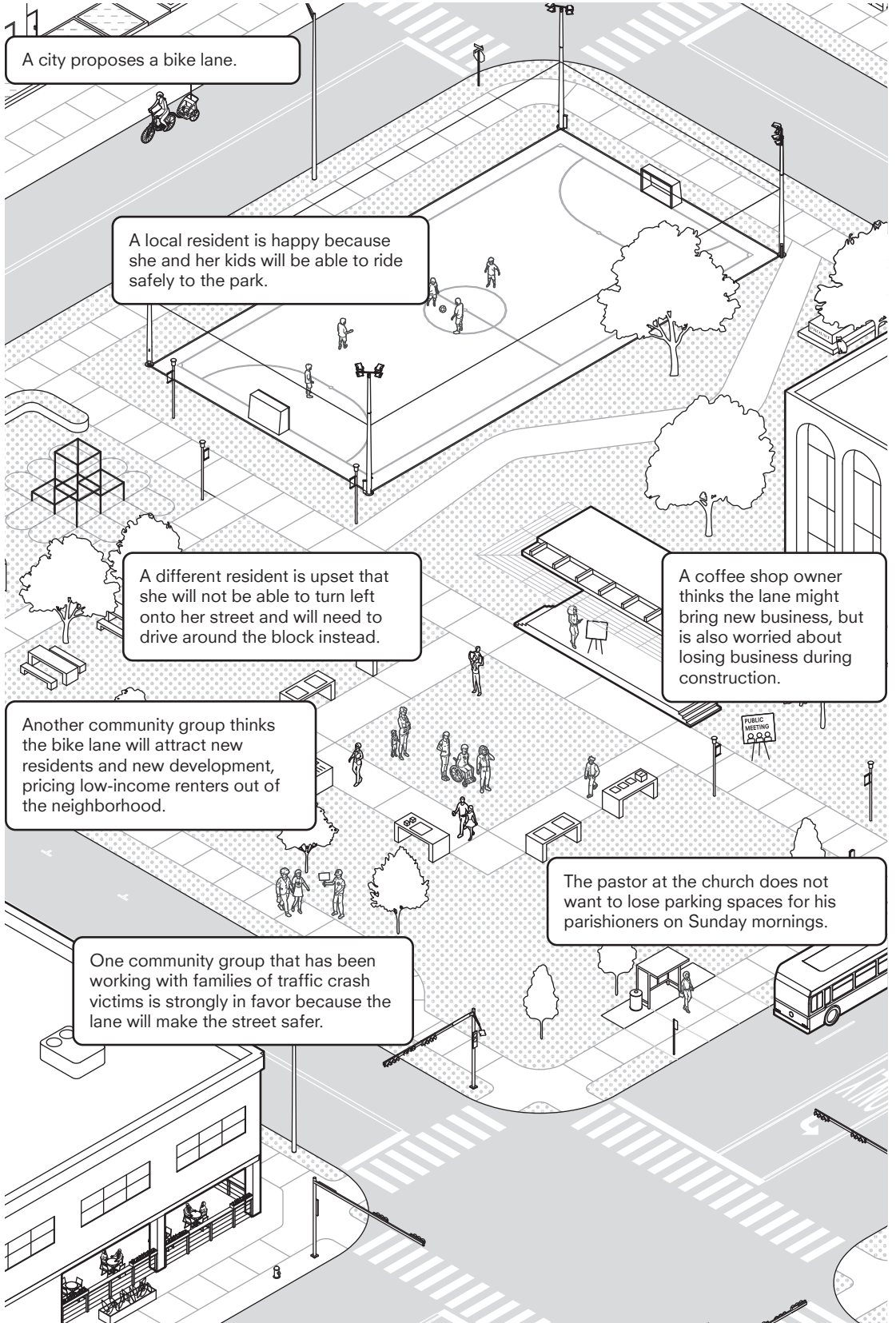
To address this concern, we have created planning systems to predict and consider those impacts. Every federally funded project must go through an environmental impact process under the National Environmental Policy Act of 1969. Typically, the process involves hundreds of pages of reports detailing the purpose and need of the project, the environmental impacts, and alternatives considered. Environment here means both natural and human-made environments—parking spaces as well as frog ponds. This work is based on simulations (like traffic and ridership models), data analysis, and on-the-ground assessments. In most cases, the requirement is simply that impacts be identified and alternatives minimizing those impacts be considered. The law recognizes that some level of negative impact is an acceptable outcome of a project that serves a useful purpose. Some impacts, though, come with additional protection.

This system comes with two major challenges.

The first challenge is that we cannot fully predict impacts. Sometimes, we simply do

not have enough knowledge or understanding. More fundamentally, many impacts are dependent on human behavior. When we build a new transportation connection, we are not simply shifting existing trips to a new street or a transit line. With new travel options, people make different decisions on where to live, where to work, where to eat, where to shop, and even how often to leave home. Landowners make different choices, too, on what to build, which in turn changes the choices people have. And then cities adjust their policies based on these changes, but the outcomes are often hard to predict—and sometimes the results are counterintuitive. In the 1950s, cities lobbied to get freeways built into their downtowns because they believed it would protect their status as the primary hubs of employment and retail. Instead, the freeways made it easier for people to leave the city, which pulled jobs out of the core.

The second challenge is that we have to weigh the impacts. Almost every project will come with positives and negatives, which rarely accrue to the same people in the same measure. For example, one neighborhood might get a faster connection to downtown at the expense of a different neighborhood having the freeway bulldozed through it. These decisions can—and often do—lead to inequitable results. We have to decide what we value, which raises tough and important questions. Which trips are more important? Who matters more, the people living in a neighborhood or the people passing through it? Are we trying to serve people in cars, on foot, on micromobility devices, or on transit? Are we considering people with disabilities? Should we build for people who are already there or for future growth? Do we prioritize speed or safety? Are we trying to avoid future inequities or remedy past inequities? And ultimately, who gets to decide?



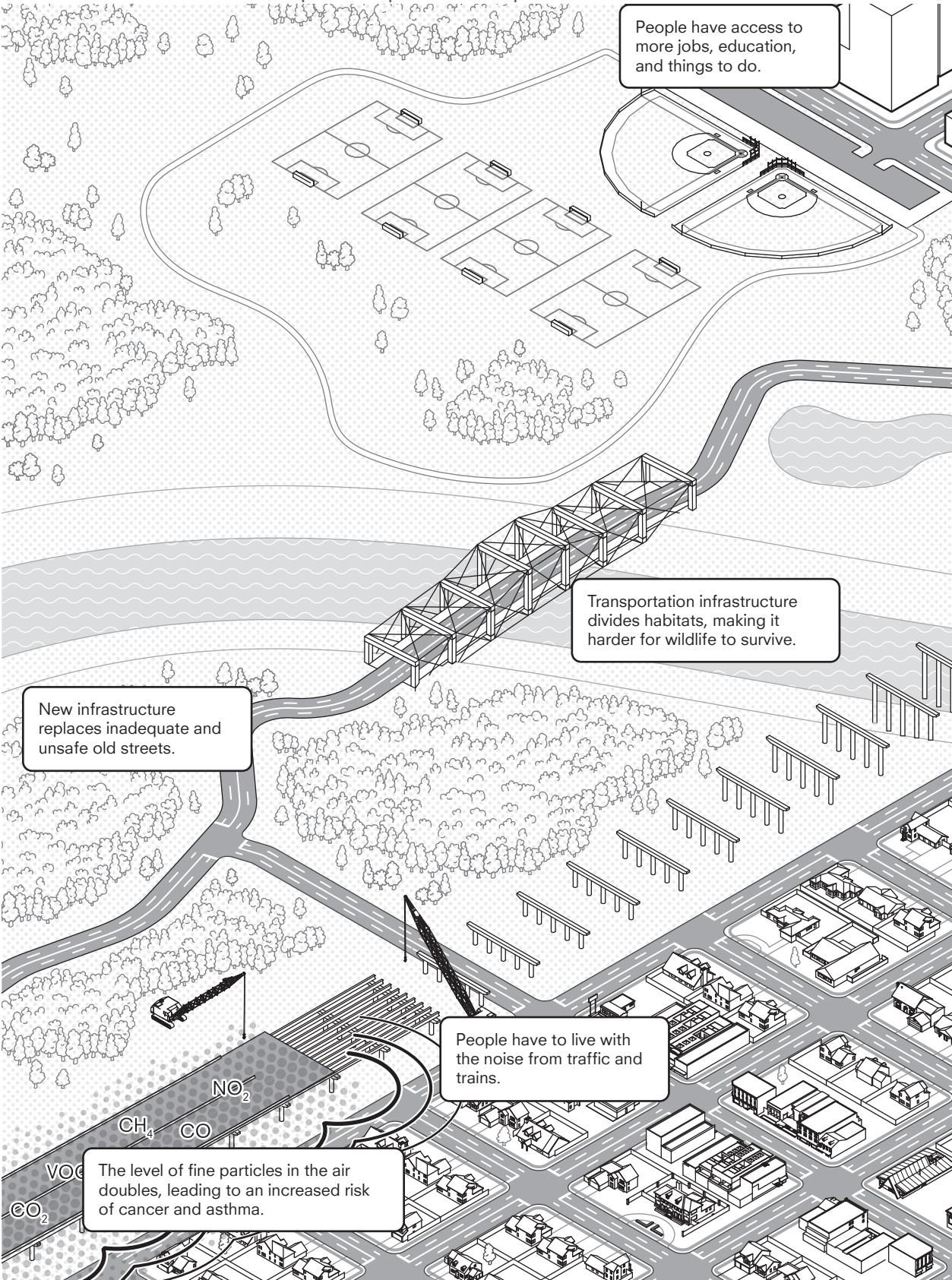
People have access to more jobs, education, and things to do.

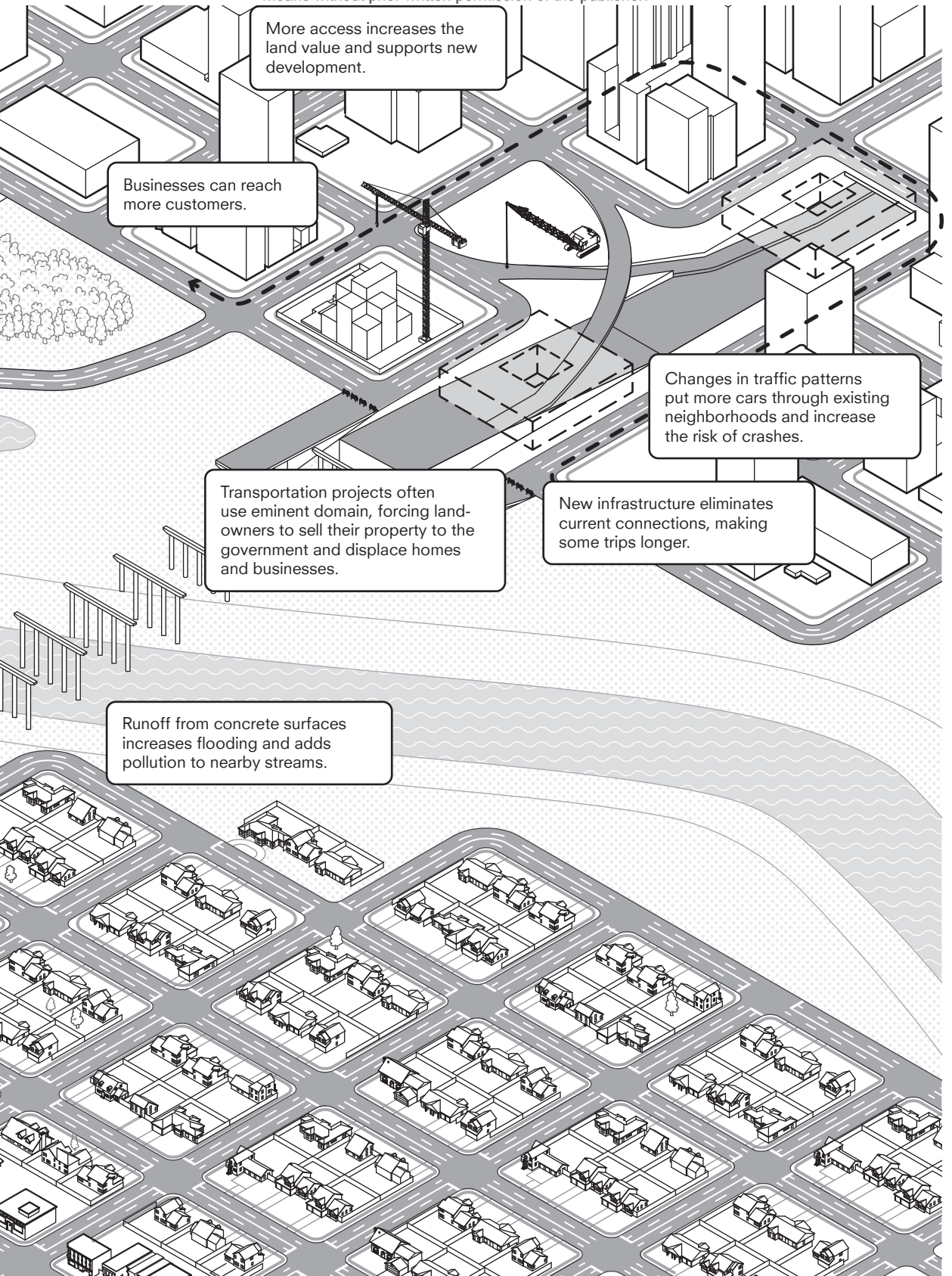
Transportation infrastructure divides habitats, making it harder for wildlife to survive.

New infrastructure replaces inadequate and unsafe old streets.

People have to live with the noise from traffic and trains.

The level of fine particles in the air doubles, leading to an increased risk of cancer and asthma.





More access increases the land value and supports new development.

Businesses can reach more customers.

Changes in traffic patterns put more cars through existing neighborhoods and increase the risk of crashes.

Transportation projects often use eminent domain, forcing land-owners to sell their property to the government and displace homes and businesses.

New infrastructure eliminates current connections, making some trips longer.

Runoff from concrete surfaces increases flooding and adds pollution to nearby streams.

All Transportation Is Political

An old saying goes, “Don’t tell me what you value. Show me your budget, and I’ll tell you what you value.” That is self-evidently true of transportation: The decisions on what kind of transportation we build reflect the kind of cities we want to create. But the more complicated question is about who makes those decisions—and whose values they reflect.

We have built a complex system of transportation governance and funding through decisions made over centuries. Some transportation networks are built and operated by states, some by local governments, and some by private companies. Some are funded through income taxes, some through gas taxes, some through sales taxes, and some through tolls. Some get 90 percent of federal funding, some get 50 percent, and some get none. Different agencies build different modes and have different powers. Many different elected and appointed bodies make these decisions. The mechanisms that do exist for multimodal regional planning are grafted on top of preexisting systems.

All these decisions also have to balance expertise and public input. Engineers, planners, and designers understand how technologies work, what is possible, and what is safe. But the people who live and work in the city know what they value. Sometimes, like in the Progressive Era of the 1910s, the United States has elevated

technocrats as decision-makers; at other times, like in the 1970s, it has created systems to give the public a greater voice. But no technical expert is truly neutral, and no public input process is truly representative.

In reality, every decision reflects political power. Places that have political influence get benefits, whereas places that do not suffer the impacts. Historically in the United States, wealthier and whiter neighborhoods have tended to get more projects that benefit them, and poorer neighborhoods as well as neighborhoods with more Black and Hispanic residents have tended to be displaced and disconnected by new infrastructure. Similarly, the needs of people in cars have often been valued over pedestrians, bicyclists, and transit riders. Ultimately, though, it all comes down to who is in the room making the decisions.

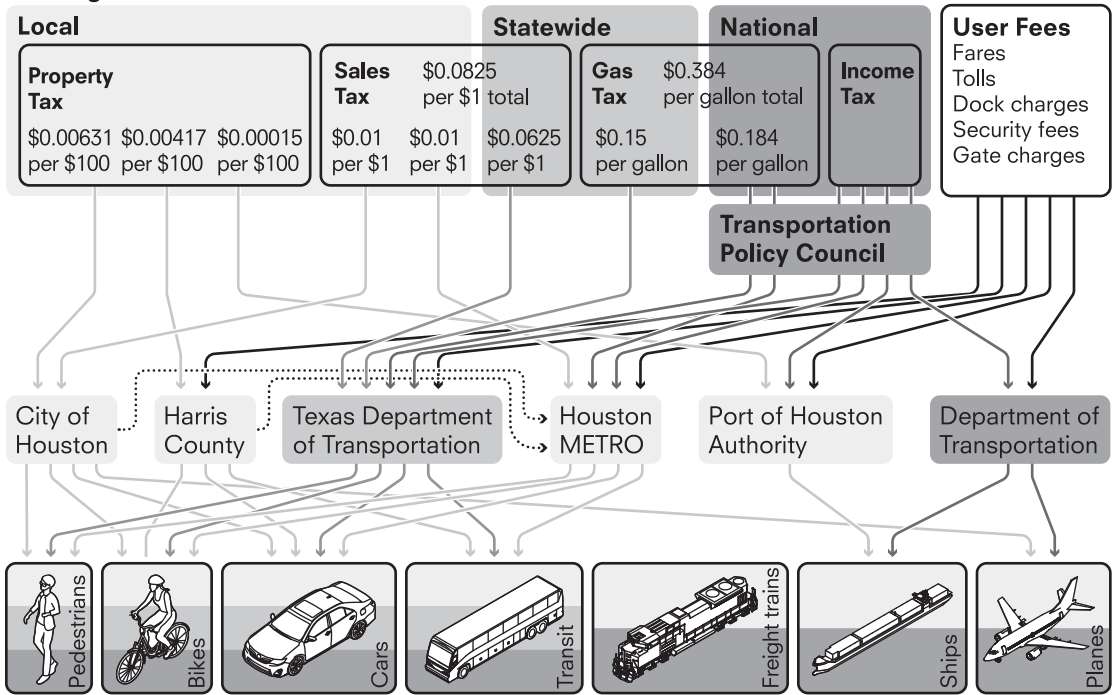
These decisions are not only made project by project; they reflect a set of goals that may or may not be clearly articulated. Every project is part of a vision for what a city should be.

No transportation project will ever reflect everyone’s values. Nearly every decision ultimately helps some people and harms others. And so, while every transportation reflects technical constraints and travel demands, it also reflects the systems that created it, and those systems reflect who has power and who does not.

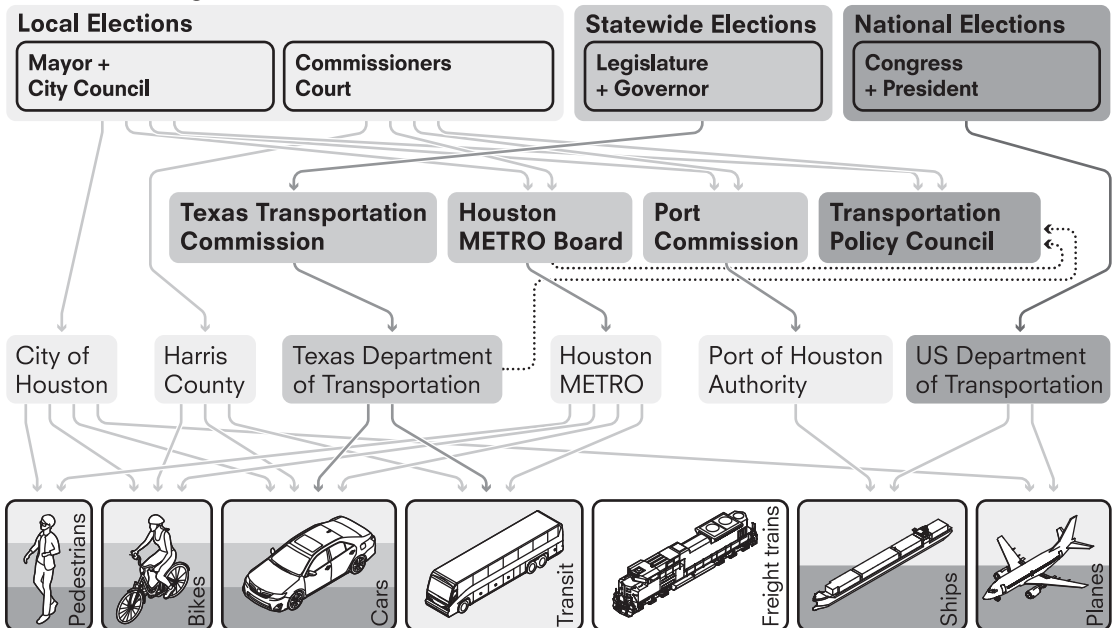


The way we allocate transportation funding today was not a foregone conclusion; it took major shifts in public opinion. In 1952, Texas highway supporters, including local chambers of commerce, organized a statewide event to promote more spending on roads. (TxDOT Photo Library.)

Funding Process



Decision-Making Process



These charts outline the funding and decision-making process for transportation projects in Houston. Each mode in the city (bottom row) has infrastructure built and maintained by multiple agencies. Most agencies have multiple funding sources at different levels of government. The decisions on what to spend fall on a variety of elected officials as well as boards appointed

by those officials. This system was created by people the public elected—and sometimes directly by public vote—but few of the city’s residents fully understand how it works. Not shown here are the multitude of organizations trying to influence these decisions and the funding behind them.

We Travel for Many Reasons

It is not unusual to refer to drivers or transit passengers as *commuters*; much of travel planning is centered around nine-to-five commutes. The typical travel picture, though, is much more complicated.

We travel a lot. The average American traveled 29 miles per day in 2022¹ and spent 40 minutes a day driving a car² (it was 36 miles and 56 minutes a day in 2017, before COVID-19).

Most of our trips are local. Americans travel all over the country and the world, and in 2022, the average American flew 2,900 miles a year, or 8 miles a day.³ Only 2 percent of trips in 2021 were more than 50 miles. Twenty-eight percent were under a mile.⁴

We make a lot of trips. On average, in the United States, we took 3.4 trips a day in 2017 and 2.3 trips a day in 2022.⁵ (This drop is due to reduced travel, especially commuting, during COVID, and travel is increasing again.) Our trips include a significant amount of *trip chaining*—one trip attached to another, like dropping off kids at school on the way to work. The number of trips is similar regardless of how

big a city people live in—people in big cities make only 10 percent more trips than people in rural areas.⁶

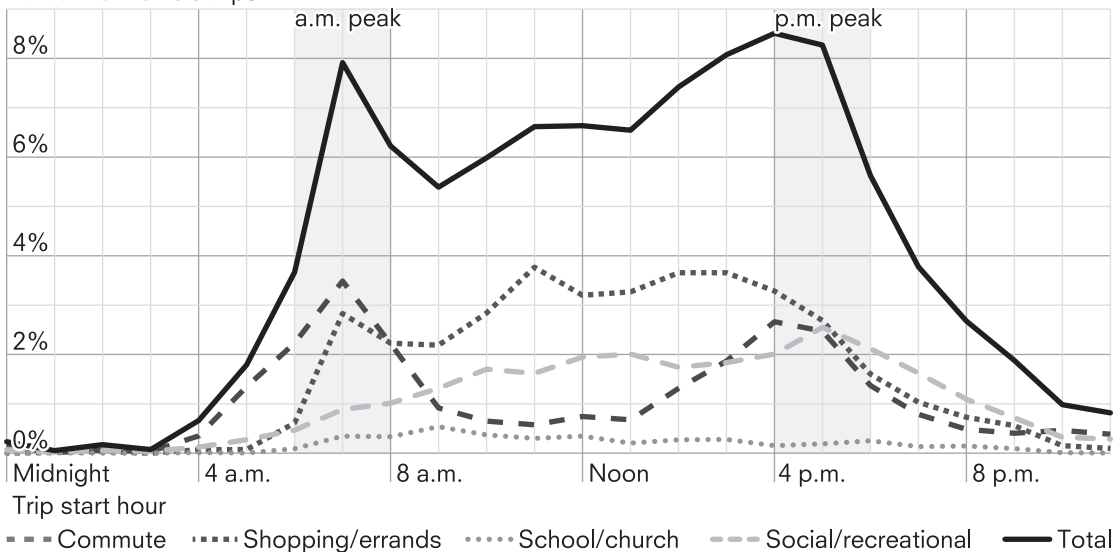
Most of our trips are not commutes. In 2022, work commutes made up only 18 percent of trips. Thirty-five percent were shopping and errands, and 30 percent were social or recreational.⁷

Travel is spread out across the day. While 2022 work trips peaked at 7 a.m. and 5 p.m., some people were traveling for work at all times of the day. The busiest hour for overall travel is 5 p.m., but travel remained within 60 percent from 6 a.m. to 6 p.m.⁸

Not everyone travels the same. Women traveled slightly more than men in 2022, but made 20 percent fewer work trips and 25 percent more shopping trips than men.⁹ Women also trip chain more. People over the age of 65 traveled less than three-quarters as much as people between the ages of 18 and 65.¹⁰

Behind all those numbers are millions of individual decisions. People decide where to live and where to work. (In 2017, it was estimated that the average American moved 12 times in their lifetime,¹¹ and the median

Percent of vehicle trips



Commute travel peaks at rush hour, but errands and social travel keep overall vehicle trips high through the middle of the day. (US Department of Transportation National Household Travel Survey, 2022.)

time in a job in 2022 was four years.¹²) Then, daily, they decide where to shop, where to eat, or where to go for fun. The easier it is to travel, the more likely we are to go somewhere and the farther we are willing to go. This induced demand—a result of adding new infrastructure that actually causes more travel—means that attempts to “end congestion” often backfire since more trips will fill up a widened roadway. But it also means that more people may be making trips that make their lives better.

However, our transportation decisions do not reflect free choice. We travel using the options we have. For many trips in the United States, the car is the only option. On others, different modes vary massively in time, cost, and safety. In 2019, for example, the average New Orleans resident could reach 12 percent of regional jobs with a 30-minute transit commute, but 89 percent with a 30-minute car commute.¹³ The infrastructure we build collectively sets the choices we have individually.

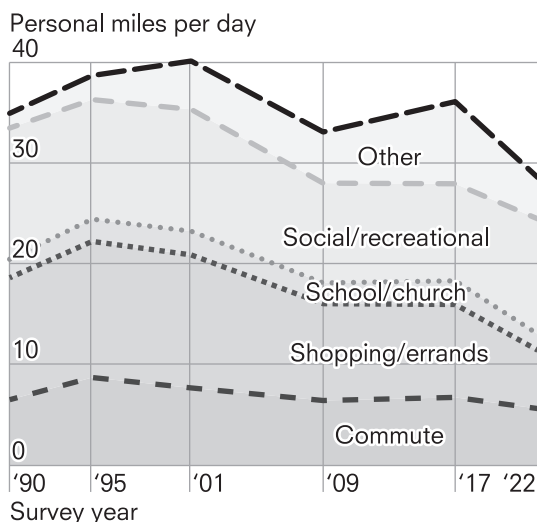
We are not the only thing moving. Our lives depend on food, clothes, and many other things being delivered to our local store or to us directly. The United States moved nearly 16,000 annual ton-miles of cargo per capita in 2022.¹⁴ For every mile

we travel, a ton of stuff travels an equal distance. Here, too, choices are being made as shippers and logistics companies locate factories and design networks. As shipping has gotten cheaper, our goods travel more and more.

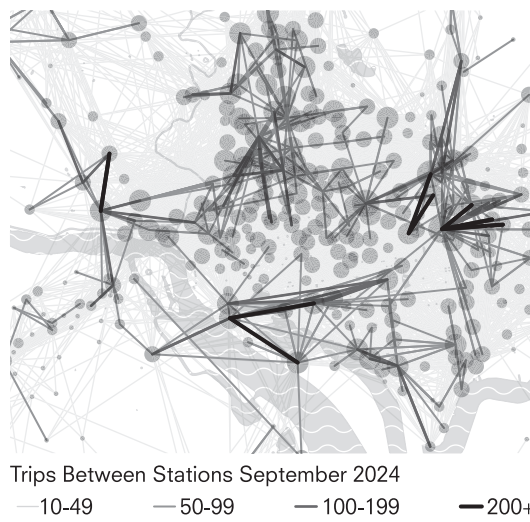
All this complexity needs to be considered in designing projects. We do so using computer models that attempt to quantify how many people will use a new piece of infrastructure and how that will affect the use of the rest of the network.

Even for current demand, predictions are always inexact. We do not know exactly how people choose which road to drive down or which bus route to take, or indeed whether to drive or take the bus.

When we project into the future, we need to make many more assumptions. The model inputs have to include the future population of a metropolitan area, where new residential areas will be built, and where jobs will be located. These projections could be off in many ways. An area underestimating growth could end up with overcrowded trains or new suburbs without roadways to support them, but an area overestimating growth (perhaps due to booster optimism) could spend money on unnecessary concrete.



Even before COVID-19, travel had been declining slightly. (US Department of Transportation National Household Travel Survey, 2022.)



The trips made on a single transportation mode in a single urban area (Capital Bikeshare in Washington, DC) show the complexity of travel patterns.

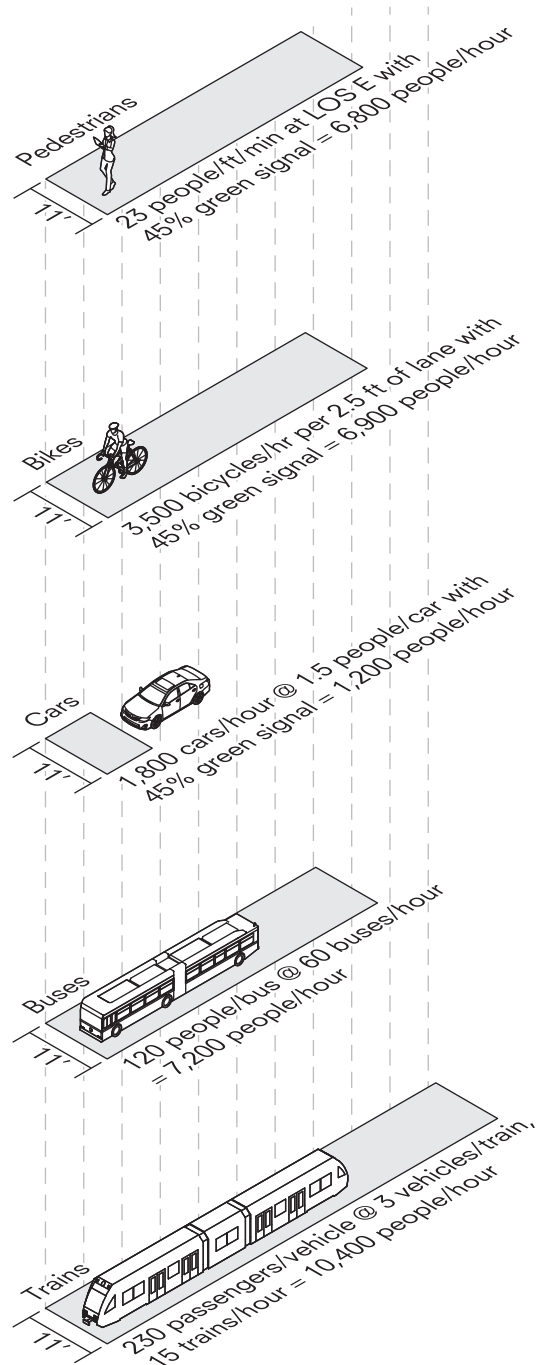
Every Mode Works in Different Ways

In a typical US city, people can move as pedestrians, on bicycles and other micro-mobility devices, in cars, and on transit. Cargo moves on trucks and trains. Cities must be designed to accommodate all those modes. But each has its own particular geometry: different sizes of vehicles, different speeds, different capacities.

The five major modes of ground transport—pedestrians, micromobility, cars, trains, and transit—vary from a 6-foot-tall pedestrian to a 6,000-foot-long train.

Some of the aspects of each mode are inherent physics and geometry. Those will be the same anywhere in the world, and international networks of trade and exchanges of ideas have led to a great deal of uniformity across continents. However, every country has its standards, policies, funding mechanisms, and politics. The role of different transportation modes can vary dramatically from place to place. Therefore, to reflect on the actual reality on the ground, we have confined ourselves to the United States.

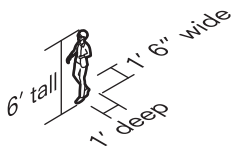
Planes and ships are also essential parts of the transportation system. However, unlike premodern waterfronts, today's airports and ports are generally separated from the city and not part of the urban fabric. Modern airports and ports are massive, spanning areas as large as entire cities, and the vehicles moving across the water or through the sky do not compete for space with ground transportation. For that reason, we do not cover them in this book.



There is no doubt that different modes of transportation have very different capacities in equal space. Still, it is remarkably hard to get agreement on exactly what those capacities are since there are so many variables. Here is an attempt, with assumptions stated.

Pedestrians

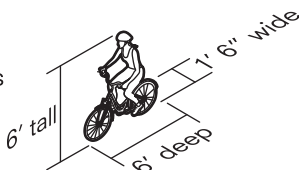
3 mph
2.4% of commutes
6.9% of trips



We have been pedestrians as long as we have been humans. Until the 1800s, cities were designed almost entirely around people on foot; pack animals and carts were a secondary consideration. Today, we have many other ways to move around, but we still all walk or roll. The sidewalk remains one of the best transportation technologies ever invented: simple to build, easy to maintain, functional with no traffic control whatsoever, and unbeaten for moving lots of people in very little space. Some of the most prosperous and busy places across the world are built around pedestrians. But the advent of cars has made walking less convenient and far more dangerous, and many places have little or no provision for walking.

Bikes

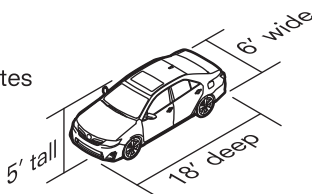
15 mph
0.5% of commutes
0.9% of trips



Bicycles combine human power with mechanical advantage. The first bicycles were developed in the 1810s, and by the 1880s, the safety bicycle had taken more or less its modern form. Bicycles combine many of the advantages of walking—low cost, efficient use of space, low energy use—with higher speed and longer range. Over the course of the 20th century, bicycles were sidelined in much of the world, with riders left to fend for themselves. However, there has been a new focus on building better facilities to make room for bicycles in cities.

Cars

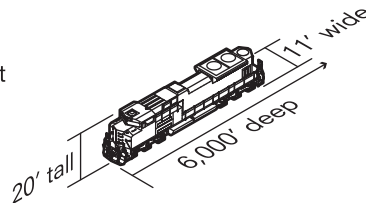
65 mph
78.2% of commutes
87.4% of trips
41% of freight



Cars are the dominant mode of transportation today. The first practical internal combustion engine car was built in 1885, and by the 1910s, cars were being mass-produced around the world. Nothing matches the car's flexibility; the ability to travel almost anywhere, anytime, has transformed our lives. But no other mode takes as much space per person. Building cities for cars has taken large-scale government intervention and massive construction. Fitting cars in safely is the hardest part of any urban design exercise. Car crashes are one of the leading causes of death around the world.

Trains

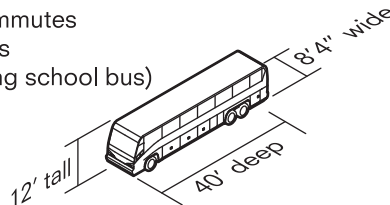
70+ mph
29% of freight



Trains take advantage of steel rails to move more weight with less energy and to couple many cars together. They are by far the largest form of ground transportation—often up to a mile long and able to move well over a hundred million pounds of freight or two thousand passengers. For the first century after the steam-powered train was invented in the 1830s, the railroad was an all-purpose mode of transportation. With the introduction of cars and buses, rail has become more specialized, used primarily where large volumes of passengers and large volumes of freight need to be moved. Rail freight remains essential to the US economy, and the largest metro areas still depend on rail transit.

Transit

3.5% of commutes
1.4% of trips
(not including school bus)



Transit is a mode, not a technology; it is a way to use a train or a bus (which is really a large car) to move many people at once by having it operate on an announced route on a published schedule and letting anyone who wants a ride (and can pay the fare) on board. That is a powerful idea: It takes the street space occupied by two cars and uses it to move 80 people. In high-density areas with high demand, transit not only moves lots of people but offers a kind of freedom that walking (with its limited range) or driving (with its high cost and dependence on finding parking) does not. The largest cities in the United States would not function without transit.

(Commuter data: 2023, Bureau of Transportation Statistics; trip data: National Household Travel Survey 2022; freight data: Bureau of Transportation Statistics, 2022.)



Confluence Park, Denver, Colorado

PEDESTRIANS



It Is Easy to Make Space for Pedestrians, but Harder to Make Places for Pedestrians

Walking is our oldest mode of transportation; humans have been walking as long as there have been humans. It is also the only mode that everyone, in every place on Earth, uses. (We are being inclusive here—people in wheelchairs are pedestrians, too, and this chapter is about rolling as much as it is about walking.) As we develop more ways of getting around, we do less of our moving on foot. Still, everyone traveling—every car driver, every train rider, every bus rider, every bike rider, and every airplane passenger—starts as a pedestrian and becomes a pedestrian again at the end of their trip.

Geometrically, pedestrians are the simplest mode to design for. People do not vary in size very much (even someone in a wheelchair is only 12 inches wider than someone on foot), and we are very maneuverable. Designing for people does not require the attention to turning radii, braking distance, or traffic control that other modes do. Pedestrians are also very space-efficient: Nothing moves more people in the same space as a simple sidewalk. Like all forms of transportation, we have some limitations—going up and down can be tricky, for example—but as a design challenge, pedestrians alone are simple compared to other modes.

When it comes to urban design, though, pedestrians are demanding. We move slowly enough to experience the world around us in detail, and we all get bored easily. An enjoyable walk is not just geometrically possible; it is visually interesting. The world's greatest architects, urban designers, and landscape architects have spent centuries designing how people on foot will see a place and how they will feel in it.

Furthermore, in the modern world, we have introduced another complication. Humans are now surrounded by other forms of transportation that are bigger and faster than the human body. We are remarkable in our ability to move and to heal, but in the way of fast-moving machines, we are fragile. Much of what we call pedestrian design today is not pedestrian design at all; rather, it is designing other modes so that they do not kill or maim pedestrians. We will address that issue in later chapters.

(continued...)

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