WHAT ARE COMPLETE STREETS?

Getting Started

This section presents the core elements of Complete Streets and introduces goals and objectives that are explored in this manual.

1a

Complete Streets

It's a movement that brings together policy and people, networks and neighborhoods, designs and destinations. The Complete Streets concept reclaims streets for people, reexamines the public realm, and challenges some commonly held perceptions about transportation. Implementing Complete Streets concepts can reprioritize funding to projects that embrace a Complete Streets process and lead to a Complete Streets outcome. The individual concepts listed here are neither novel nor untested; transportation professionals know how to build great streets, and there are many examples of Complete Streets in communities nationwide. This manual brings together the principles of Complete Streets to provide solid guidance for design implementation.

FIGURE 1.1A
PEDESTRIANS
Tinley Park, IL

FIGURE 1.1B
BICYCLISTS
Chicago, IL

FIGURE 1.1C
TRANSIT
Chicago, IL

FIGURE 1.1D
PLACE
Oak Park, IL

FIGURE 1.1E
VALUE
Chicago, IL

ELEMENTS OF A COMPLETE STREET 1.1

So what does a Complete Street look like? Simply put, it is a street that is safe and accessible for all users: pedestrians, bicyclists, transit users, and motor vehicle drivers. Complete Streets accommodate people of all ages and physical abilities. There is no single formula or prescription for the Complete Street: It is "complete" because it speaks to the context of the surrounding area; it is a statement of its place. But while it is understood that not every Complete Street will (or should) include all of these elements, the following list represents the key concepts underlying Complete Streets:

PEDESTRIANS Quality pedestrian facilities include adequate unobstructed walking space, adequate lighting, benches, trees, shading, roadway separation and on-street parking, easy access to walkable destinations, and safe and frequent crossings.

BICYCLISTS Quality bicycle facilities include spaces comfortably shared with traffic, clearly marked bike lanes (or appropriate separation based on speed and volume of vehicle traffic), adequate bicycle parking, intersection treatments, and destinations accessible by bike.

TRANSIT Quality transit facilities include connectivity to the bicycle and pedestrian network, functional shelters, separated/prioritized travel ways, coordinated land use planning, bike parking, lighting, and walkable and bikeable distances between stops and stations.

PLACE Complete Streets are places. They do not simply link destinations; they are destinations in themselves, including places for sidewalk dining, social gathering, exercising, and relaxing. Designing Complete Streets requires an understanding of network priority and context, to move from vision to plans to implementation.

VALUE Complete Streets can enhance property value. Streets design can support commerce though such tools as sidewalk dining, street sales, and bike parking.

Many approaches can lead to Complete Streets: Context-Sensitive Solutions, Living Streets, and Green Streets all fall within the scope of the concept. The Complete Streets movement creates a common language for policy development and provides an understanding of the common elements of Complete Streets. The end result will be better, safer streets that benefit everyone.

DEFINITIONS 1.2

The National Complete Streets Coalition definitions of Complete Streets and Complete Streets Policy:

Complete Streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a Complete Street.

Complete Streets Policy ensures that transportation agencies routinely design and operate the entire right-of-way to enable safe access for all users: Drivers, transit users, bicyclists and pedestrians, including older people, children, and people with disabilities.

These definitions emphasize the users of the transportation network. Appropriate design will address user access and safety. Effective policy will require appropriate design and prioritize the needs of people.

However, implementation of thoughtful transportation policies is not always simple or straightforward. The progression of moving from policy to construction to use must incorporate many issues, including right-of-way priorities, funding, and land use coordination. A Complete Streets policy and design process allows decision makers to weigh these issues thoroughly and select the best outcome.

The application of a Complete Streets policy will require coordinating plans, jurisdictions, and agencies. Implementation will require an honest look at how infrastructure spending and prioritization address economic development, environmental impacts, and social equity. The policy aims to produce design outcomes that support people and the places where they live, work, and play.

PURPOSE OF THIS MANUAL 1.3

A Complete Streets approach combines the physical planning, design and maintenance of infrastructure with an institutional understanding of project management, funding, and prioritization. The manual presents a structure for placemaking through street design, mode prioritization, and network optimization. It establishes baseline processes for bringing Complete Streets policy to fruition.

GOALS OF THE MANUAL 1.4

This manual will help to advance the following Complete Streets goals:

ESTABLISH DESIGN PRACTICES Provide an explanation of Complete Streets elements and tools, and recommend methods for achieving Complete Streets through planning and design processes.

ADDRESS CHALLENGES Provide best practices for implementing Complete Streets, including multimodal design and prioritization.

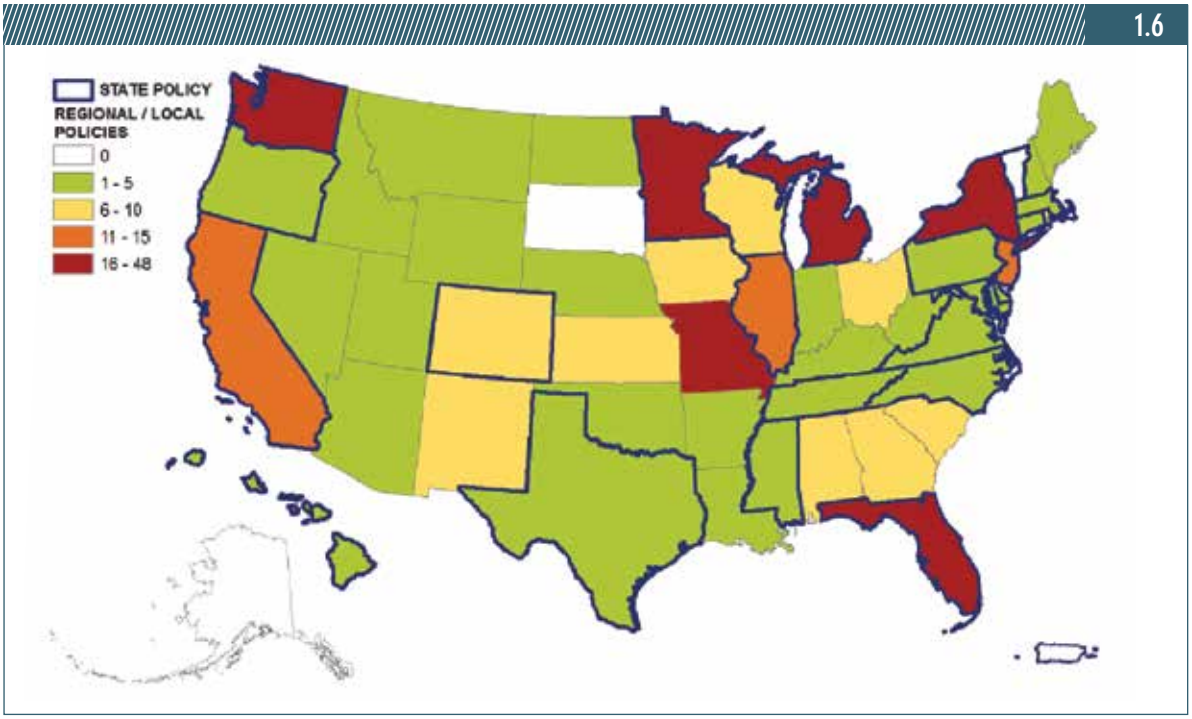
COORDINATE INITIATIVES Provide guidance for sustainable transportation by establishing pathways for local, county, and state roadway jurisdictions and planning bodies to consider Complete Streets in planning, design, operations and maintenance processes.

OBJECTIVES OF THIS MANUAL 1.5

Transportation systems designed using the methods outlined in this manual will enable agencies to achieve the following objectives:

- Provide attractive, accessible transportation choices for people of all ages, physical abilities, and income levels
- Enhance the personal safety and security of people using the streets
- Encourage people to travel by walking, bicycling, and transit and reduce car use
- Improve community health through expanded use of active transportation
- Promote energy conservation, improve air quality and reduce other negative environmental impacts of the existing roadway network by reducing car use and expanding green infrastructure
- Enhance the value of land uses that are adjacent to the street
- Create livable neighborhoods
- Increase civic space and encourage human interaction
- Increase access to jobs, goods, and services
- Promote the economic well-being of the community

FIGURE 1.6
COMPLETE STREETS
POLICY MAP
State and local governments across the United States have adopted Complete Streets policies. This map shows which states have adopted local, state, or both types of policies.



COMPLETE STREETS POLICY 1.6

This manual is intended to assist jurisdictions in the effective implementation of Complete Streets Policy. An adopted Complete Streets policy demonstrates that elected officials and decision makers are dedicated to providing multimodal access to all residents. Creating a policy requires the coordination of multiple levels of government and the dedication of planning, engineering, operations, and maintenance staff.

The National Complete Streets Coalition assesses the strength of policies in 10 areas, commonly referred to as the 10 elements of Complete Streets. The elements are:

- Vision
- Connectivity
- Jurisdiction
- Phases
- Exceptions
- Design
- Context Sensitivity
- Performance Measures
- Implementation Plan

Considering the relationship between each of these elements and the design and planning process helps communities to move from the initial step of enacting good policy to the ultimate goal of creating great, livable streets.

Agencies should seek to create policy statements that include each of the 10 elements while addressing the specific needs of their communities. Jurisdictions can enact a Complete Streets policy by ordinance or by resolution.

WHY COMPLETE STREETS?

Getting Started

Complete Streets benefit people and their communities. This section discusses the importance of planning and developing efficient design processes.

1b

A FOCUS ON PEOPLE 1.7

Complete Streets allow every user to go everywhere. To meet user needs, policy makers must consider the many types of bicyclists, pedestrians and transit users and assess the impact their differing needs will have on network prioritization, design and facility choice. Different types of facilities are preferred by the elderly, children, commuters, and people with a variety of disabilities. Similarly, bicycle planning must address different systems development for novice, casual and vehicular cyclists. In a complete network, different routes can address access to key destinations for each kind of user.

Complete Streets' focus on people emphasizes the concepts of "walkability" and "bikeability," which reference an environment's friendliness to trips by foot or by pedal. Walkability and bikeability, while subjective, can be assessed for planning purposes. Walking and biking field surveys are routine in many planning processes, and a number of organizations have developed methods for rating walkability and bikeability. The University of North Carolina's Pedestrian and Bicycle Information Center, supported by the Federal Highway Administration, gives "Walk Friendly Community" designations, awarded at levels from bronze to platinum, to communities that have demonstrated a commitment to improving and sustaining walkability and pedestrian safety. The League of American Bicyclists (LAB) awards similar designations to "Bicycle Friendly Communities." The U.S. Green Building Council stresses walkability in its LEED for Neighborhood Development rating system, giving the most heavily weighted credit for Walkable Streets.

When evaluating walkability and bikeability, it is important to consider both the length of trips and the amenities available along the way. Generally, a 10- to 20-minute trip by an active mode to your destination or a major transit access point is considered reasonable and feasible; this translates to roughly ½ mile to 1 mile by foot and 2 miles to 4 miles by bike. A pleasant trip on a well-designed roadway can easily extend this range.

Walkability and bikeability play key roles in creating access to transit, which in turn is a vital component of an active transportation network. Every transit trip starts and ends with a walking trip. The Federal Transit Administration has issued a policy statement (FTA-2009-0052) that makes all pedestrian improvements within ½ mile of a transit stop or station, and all bike improvements within 3 miles of a transit stop or station, eligible for FTA funding.

FIGURE 1.7A
CASUAL BICYCLIST
Chicago, IL

FIGURE 1.7B
CHILDREN
Chicago, IL

FIGURE 1.7C
SENIORS
Chicago, IL

FIGURE 1.7D
ADVANCED BICYCLIST
Chicago, IL

FIGURE 1.7E
PEOPLE HAVING FUN
Chicago, IL

CREATING EFFICIENCIES 1.8

Complete Streets implementation requires coordination of transportation planning processes. While it can be challenging to implement new workflow models in organizations, new processes also can yield improvements in efficiency. For example, checklists provide a simple method to track implementation of Complete Streets through various stages of the planning and design processes. Model checklists for decision-making are included in Chapter 5.

BENEFITS 1.9

Complete Streets offer benefits that accrue to everyone, especially to individuals and families without access to private vehicles. Providing active transportation facilities gives this population access to essential goods and services. Active transportation also is an essential component of healthy and livable communities; recognition of the interdependence between transportation, land use, and the environment has resulted in a national effort to better integrate these planning and funding streams. Continued growth in population, as well as shifting demographics, will require a multifaceted approach to assure quality of life, especially in urban areas. Benefits include:

SAFETY AND SECURITY BENEFITS Designing streets for bicycle and pedestrian access reduces vehicular conflicts and related crashes. "Eyes on the street" and improved lighting also can reduce crime.

HEALTH BENEFITS Active transportation is an excellent way to integrate exercise into daily activity, helping reduce obesity and related chronic illness, such as diabetes and heart disease. Access to sidewalks and other active transportation facilities is linked to higher rates of physical activity.

CHOICE Many people want to use active transportation but the existing roadway network discourages walking and biking.

ACCESSIBILITY Mobility is primarily a means to an end; the end being improved access to destinations. Complete Streets expand access by improving multimodal capacity, allowing people to avoid congested auto commutes.

ENVIRONMENTAL BENEFITS Human power is clean power. Complete Streets enable the shifting of trips from single vehicle occupancy to non-motorized travel, reducing emissions of greenhouse gases and other pollutants.

ECONOMIC BENEFITS Property closer to parks and trails, and on streets with sidewalks, often has a higher market value than similar properties in less walkable areas. Community businesses benefit from increased foot traffic. Looking forward, changes in U.S. demographics are likely to require shifts in transportation planning to accommodate an aging populations and an increase in one-person households.

TRANSPORTATION EQUITY Automobile-focused transportation planning has created inequities in access and mobility for many, including older adults, people with disabilities, lower-income families and individuals, and people living in inner-city and rural communities. These groups are more likely to rely on walking, bicycling, and public transit; transportation systems designed to promote car transportation renders those who lack car access more vulnerable and marginalized.

SOCIAL BENEFITS User enjoyment and community livability.

SUBSTANTIAL RESEARCH SUPPORTS THE BENEFITS OF INVESTMENT IN ACTIVE TRANSPORTATION:

People without cars make twice as many walking trips.

One-third of Americans don't drive.

By 2030, 20% of Americans will be over 71 years of age.

Building sidewalks reduces pedestrian risks by 88%.

50% of all metro trips are shorter than 3 miles, and many are under 1 mile; these are bikeable and walkable distances.

70% of adults want more facilities for non-motorized travel.

Building more facilities for non-motorized travel will increase non-motorized trips (mode shift).

See Complete Streets fact sheets and Victoria Institute Study
Source: http://www.greatcommunities.org/toolkit

THE ROLE OF PLANNING 1.10

Complete Streets planning seeks to prioritize different modes of travel on different corridors, based on network constraints and adjacent land use. This guide recommends using a system of street typologies and context zones to prioritize both the modes and the corridors for active transportation facilities. Multiple modes are required for the network to serve all users and all destinations. Planning for the automobile remains a large part of the process; however, the primary focus has shifted from vehicular mobility to destination accessibility.

Using context zones and street typology for roadway design will not hinder automobile use. In fact, integration of many modes can reduce vehicular demand in the transportation system, thus improving the function of the system for car drivers as well. Land use planning and zoning strategies can also be adapted to support Complete Streets. Other strategies, like congestion pricing, can help to optimize the transportation system and encourage people to use multimodal accommodations.

PRINCIPLES OF COMPLETE STREETS

Getting Started

This section contains background and supporting information that illustrates the basic concepts, components and principles of Complete Streets.

1C

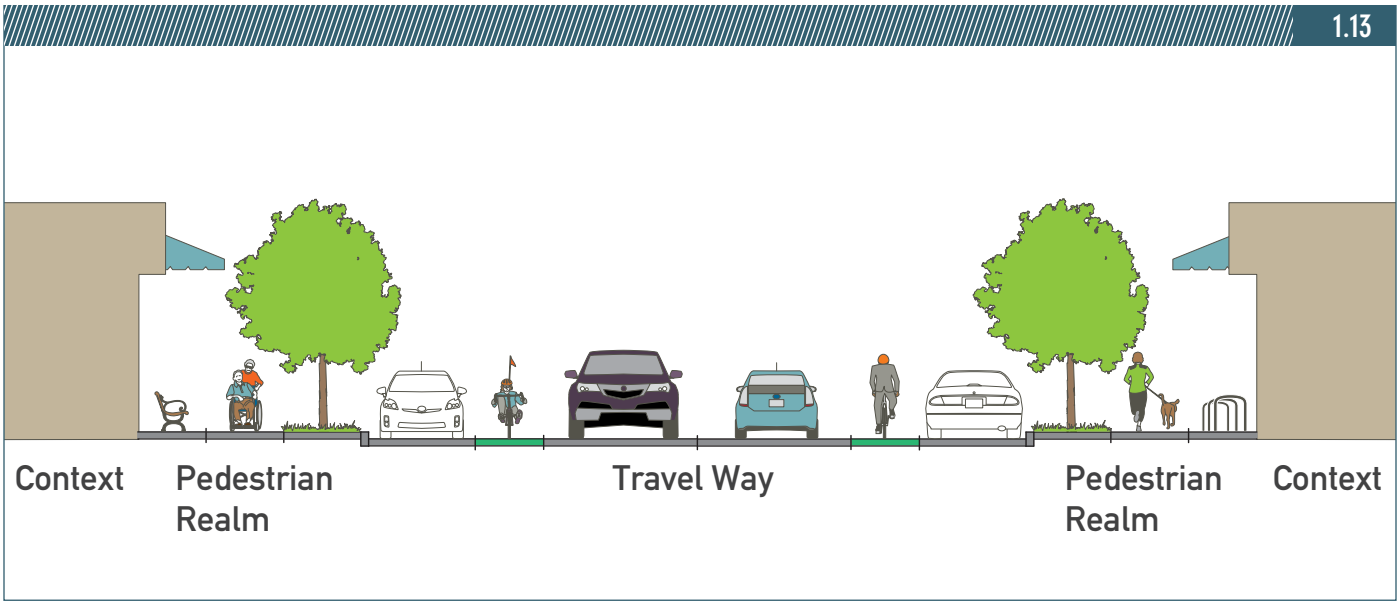


FIGURE 1.13
COMPONENT ZONES

RIGHT-OF-WAY 1.11

Complete Streets are not just between the curbs. Complete Streets consider the entire public right-of-way (ROW), which extends beyond the vehicular travel ways. In urban and some suburban settings, the far side of the sidewalk can indicate the extent of the ROW, but it can reach beyond such visually discernible limits.

PUBLIC, QUASI-PUBLIC, PRIVATE SPACE 1.12

Complete Streets planning considers adjacent land uses. Whether privately held or public, as in parks or public institutions, land is subject to State regulation and controlled through planning, zoning, and other ordinances. Planning also must consider the quasi-public realm – property that may be privately held but "behaves" as public space, either by design or by function, such as storefronts, building facades, and any other area that interacts with the streetscape.

COMPONENT ZONES 1.13

A Complete Street is a combination of smaller sub-areas or zones. Consistent with practices recommended in the manual, Designing Walkable Urban Thoroughfares: a Context Sensitive Approach, An ITE Recommended Practice, splits the street into three primary zones:

TRAVEL WAY The area dedicated to on-street vehicular travel, which includes bicycles. This area often also has space dedicated to parking.

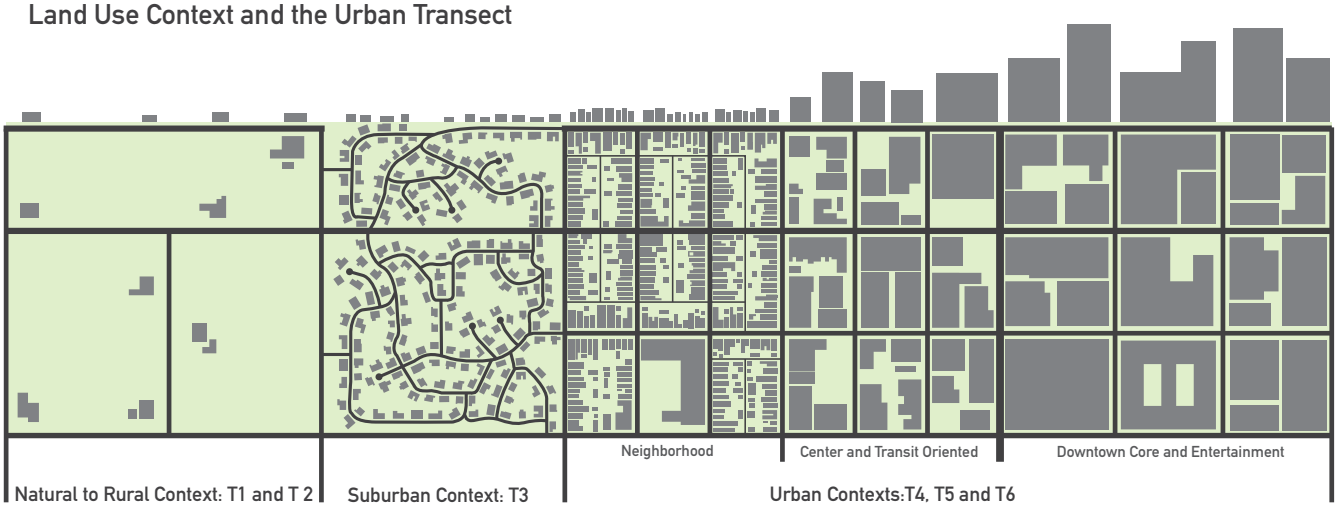
PEDESTRIAN REALM The area within the public right-of-way adjacent to the travel way.

CONTEXT The private and quasi-public realms just adjacent to the public right of way.

Each of these areas has associated uses and sub-components. This manual will primarily examine the pedestrian realm and travel way areas; however, examination of the context zone informs these components, as discussed below and in Chapter 2.

1.14

Land Use Context and the Urban Transect



LAND USE CONTEXT 1.14

Land use planning can be incorporated into Complete Street design by defining a context zone that describes the transition of the built environment from rural to urban settings. Context zones can be used as planning tools that consider building spacing, street network density, land use, special districts, and placemaking. A roadway corridor in a metropolitan area is likely to go through many context zones. Applying Complete Streets principles to roadway design will allow decisions based on the changing contexts.

FIGURE 1.14
TRANSECT DIAGRAM
The diagram illustrates the natural transition and progression of building spacing from rural to urban environments. Similar illustrations can be obtained from Center of Applied Transect Studies.

CONVENTIONAL SUBURBAN NETWORK

TRADITIONAL URBAN GRID NETWORK

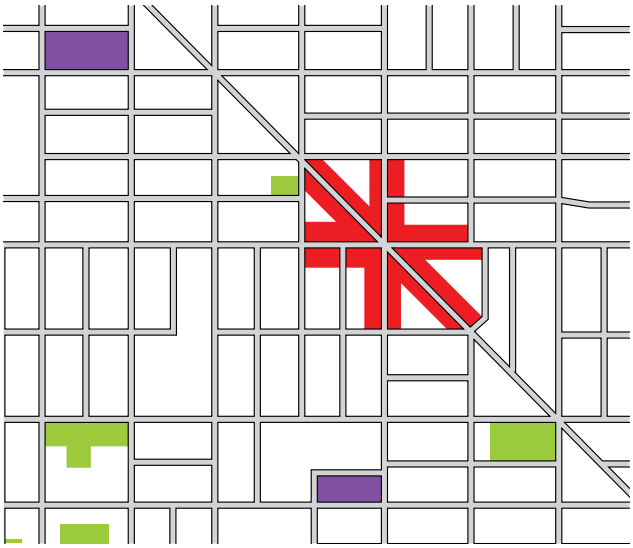


FIGURE 1.15
GRID DIAGRAMS

STREET NETWORK CONTEXT 1.15

The Complete Streets network is a series of corridors connecting people to places. While a project-based approach might focus solely on the adjacent context, a network context considers all users' expectations of the entire network. The focus extends beyond a particular corridor or intersection and its adjacent land uses to include a series of places and the corridors that link these places. Individuals traveling through these places choose the modes and facilities that best meet their needs. Sometimes people choose the most direct routes; sometimes people choose the most enjoyable routes.

There are two common network patterns in metropolitan regions:

TRADITIONAL URBAN GRID NETWORK A traditional development pattern characterized by regularly spaced streets that intersect at mostly right angles, resulting in connectivity and intersection density.

CONVENTIONAL SUBURBAN NETWORK A development pattern characterized by large arterial corridors connecting discrete residential areas of circuitous streets and cul-de-sacs. A conventional suburban development pattern can be retrofitted to improve connectivity, but such retrofits pose great challenges in both cost and design.

COMPLETE PROCESSES 1.16

The Complete Streets concept is focused on the basic transportation question: How do we get from here to there? Jurisdictions seeking to implement Complete Streets policy often face interruptions in the existing street network, such as sidewalk gaps, limited on-street bike infrastructure, and insufficient access to transit services. Effective processes must be developed to address these network interruptions.

INCREMENTAL IMPLEMENTATION

Complete Streets policy is not a design mandate, but rather a requirement for new design processes. The existing street network is large, and a comprehensive new approach can be implemented only by increments over time. With this in mind, it is important to make the effort to plan, prioritize, monitor, and update construction plans to ensure efficient, forward-looking use of funding.

Complete Streets planning practices should be integrated into current construction and maintenance practices. This requires defining priorities and obtaining funding when designs require additional expenditures. Complete Streets implementation can be accelerated by going after "low-hanging fruit" – lower-cost projects such as adding bike lanes on corridors that only require striping, improving crosswalks, and addressing small gaps in the sidewalk network.

Institutional support is the first step toward implementing Complete Streets. This requires leadership and dedication from elected officials and municipal staff, as well as a shared understanding of the ultimate value of incremental implementation. For example, designers, planners, and decision makers should scrutinize construction and resurfacing projects to ensure that they conform to long-term Complete Streets policy. Decision makers should not approve projects on high-priority corridors that fail to include appropriate active transportation facilities unless alternatives analysis demonstrates that the need is met in another manner.

MULTIDISCIPLINARY

Complete Streets implementation requires a multidisciplinary response drawing on many areas of expertise:

PLANNING AND DESIGN Transportation planners, land use planners, architects, landscape architects, and other design professionals communicate the purpose of and need for transportation projects. They can work to connect transportation with land use to create livable cities. They can integrate Compete Streets into plans and work with communities to establish a vision and goals for the implementation processes.

ENGINEERING Engineers conduct quality control and quality assurance. They adapt projects in response to real-world constraints and use engineering judgment to resolve design conflicts. They can work to encourage mode prioritization and flexible standards. They address safety concerns while assuring multimodal capacity.

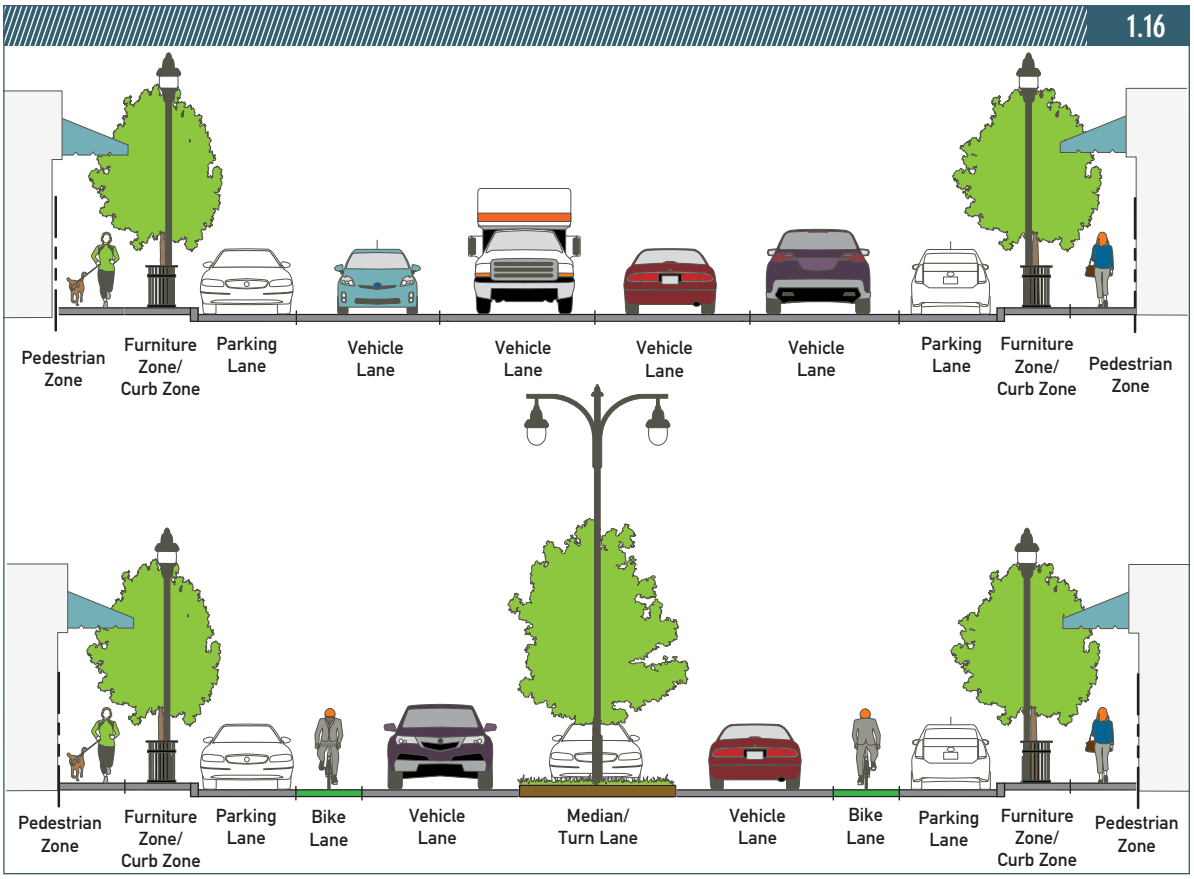
POLICY This group includes elected officials, advocates, and public agency employees, who can advocate for thoughtful policies, create institutional change, provide critical leadership, and address funding avenues.

PUBLIC HEALTH Public health workers are keenly aware of the links between car-focused transportation policy and increased rates of chronic illness, especially in lower-income populations. Public health professionals can help to communicate the benefits of active transportation, identify areas of need, and evaluate the health outcomes of transportation projects.

COMMUNITY Residents, business owners, and appointed officials can work to provide local leadership, organize advocacy efforts and promote community participation in the process of implementing Complete Streets. Community members play a key role in prioritizing a project's context, vision, and goals.[3]

[3] ITE Thoroughfare Manual pg. 6 (15 pdf)

FIGURE 1.16
ROAD DIET
Before (top) and after (bottom).



FLEXIBLE DESIGN

Complete Streets recognizes that every street is different and will require different design treatments and solutions. However, the following basic solutions are adaptable to many types of corridors and often can be used to retrofit the existing arterial corridor network:

"ROAD DIETS" Many four-lane corridors can be reduced to two lanes with a center turning lane and bike lanes. This is a practical recommendation for corridors with traffic volumes under 20,000 ADT; it also can work on corridors with volumes of 25,000 ADT, depending on turning movements. This configuration has been shown to reduce many types of motor vehicle crashes by promoting slower, more uniform speeds. It also creates safer conditions for pedestrians at intersections by reducing the number of travel lanes crossed.

"LANE DIETS" Applying a design speed of 45 mph or less on principal arterials allows for reduction of lane widths to 10 feet. A recent National Cooperative Highway Research Program (NCHRP) study has found similar safety records for 10-, 11-, and 12-foot lane widths at these speeds. Additionally, recent research has shown that motor vehicle capacity is similar for lanes of 10 to 12 feet, contrary to past belief.[4] In most cases, reducing lane width from 12 to 10 feet on a four-lane arterial will create sufficient space for a 5-foot bike lane. (AASHTO guidelines include a 1-foot gutter pan by the curb face.) This is a good solution where arterials have 5-foot sidewalks immediately adjacent to a travel lane, because the bike lane serves as a buffer to the sidewalk. If on-street parking exists, the extra foot needed often can be gained by reducing the parking lane to 7 feet.

MEDIANS Building a median between oncoming lanes can calm traffic and provide a pedestrian refuge at intersections.

INTERSECTION IMPROVEMENTS Curb extensions, textures, pavement markings, bike boxes, crosswalks, eliminating free-flow right turn lanes, tightening corner curb radii, and roundabouts can improve traffic management and safety at intersections.

More details on how to incorporate flexibility into corridor design are contained in the following chapters.

[4] The Highway Capacity Manual 2000 edition included a reduction in signalized intersection capacity of about 3% for each foot of lane width narrower than 12 feet (HCM 2000, Exhibit 16-7). However, the Highway Capacity Manual 2010 edition shows the same capacity for lanes with widths of 10 feet to 12.9 feet wide (HCM 2010, Exhibit 18-13).

COORDINATION OF COMPLETE STREETS

1D

Getting Started

In most cases, Complete Streets design is aligned with best practices for vehicular travel way design and system optimization. Complete Streets also provide a mechanism to comply with the requirements of the Americans with Disabilities Act (ADA). However, there are limits to the uses of the right of way, and conflicts can arise as competing objectives are being balanced. This section presents some basic considerations for coordinating Complete Streets with vehicular traffic, emergency vehicles, freight traffic, and ADA requirements.

NETWORK OPTIMIZATION 1.17

Network optimization for Complete Streets should consider methods beyond those traditionally used for motor vehicles. Tools and standards such as vehicular Level of Service (LOS), capacity (or intersection thru-put), signal timing and delay, and average annual daily traffic (AADT) can be used in new ways to create more livable results.

LEVEL OF SERVICE (LOS)

The LOS evaluation focuses solely on impact on vehicle flow without consideration to quality of service for pedestrians, cyclists and transit users. On the project level, using LOS as the sole standard triggers mitigation measures to improve vehicle flow that can be detrimental to other modes, such as street widening, adding lanes, and intersection flaring. While LOS can be used to evaluate the functionality of a roadway network, it is a tool best used to evaluate different design scenarios and should never supplant the design process or be used as the sole basis for design decisions.

In making design decisions, vehicular LOS should be supplemented with considerations of multimodal (MMLOS), pedestrian (PLOS), and bicycle (BLOS). Aiming for a high (C or better) vehicular LOS frequently results in overdesigned facilities. LOS level D is the appropriate target for design of most multimodal corridors, in most contexts; periods of LOS E or even F may be considered acceptable at peak periods if this results in better conditions for all users at other times of the day.

MULTIMODAL CAPACITY

Capacity, a measure of vehicular volume over speed, is highest for vehicles traveling at 35 mph, because vehicles at higher speeds require greater stopping distances. Widening intersections to increase throughput, using wide travel lanes, turning lanes, and free-flow right-turn lanes, typically results in travel at speeds higher than 35 mph. This manual recommends optimizing intersections based on network capacity and target speeds no higher than 35 mph. Capacity should be defined, not by vehicle capacity, but by multimodal capacity. One way to build trip capacity in a constrained system is to make use of a network of overlapping grids; the vehicular grid capacity is supplemented by the bicycle, pedestrian and transit grid capacity.

CURRENT AND PROJECTED TRAFFIC

AADT measures a roadway's usage by motor vehicles and helps to determine the roadway's overall importance to the vehicular network. Designs that add accommodations for bicycles, pedestrians, and transit users on high-traffic roads may reduce motor vehicle capacity, often making those designs controversial in areas with high rates of motor vehicle use. However, traffic projections based on current vehicle counts must take into account the impact that multimodal infrastructure improvements will have on users' choice of transportation mode. Wherever possible, infrastructure decisions should support "modeshift" by future users, promoting transition from motor vehicle use to walking, bicycling or transit. Modeshift can help relieve congestion by reducing a substantial amount of vehicle demand from roadways. Approximately 2/3 of trips less than one mile are by car, a distance easily walked or biked. Planning processes, network and roadway designs and projects based simply on growth projections for vehicle miles traveled (VMT) should be reevaluated, and a transition should be made aimed at maintaining, or even reducing, current traffic levels by supporting modeshifts that will reduce motor vehicle use and relieve congestion. Modeshift targets can be established through Complete Streets policy and used as a performance measure to evaluate policy implementation.

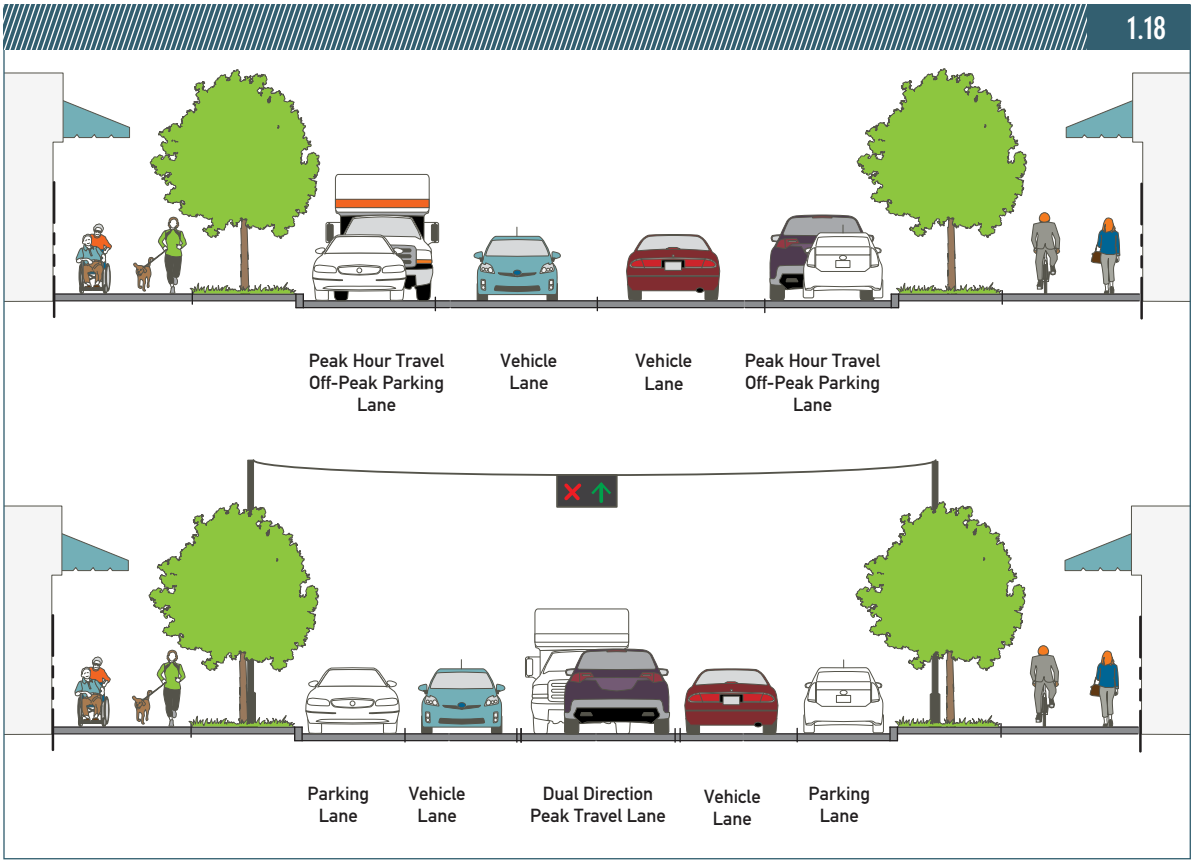


FIGURE 1.18
DIAGRAM OF VEHICULAR FLEX LANES

INTERSECTION VS. STREET CAPACITY

In urban networks, intersection (or node) capacity is a greater determinant of overall network capacity than street or link capacity. It is most important to consider the capacity at intersections, where congestion is most likely. Congestion on narrow streets can be reduced by good intersection design, which enhances capacity at intersections by using roundabouts, strategically placed left- or right-turn lanes, signal timing, etc.

SIGNAL TIMING

Signal timing is an effective mechanism to control actual travel speeds. Signal timing should be linked to target speeds, and should be a factor in the selection of design alternatives. Across the network, the most effective grid optimizations can be achieved by signal locations spaced ¼ mile apart: Greater spacing allows vehicles to accelerate beyond the optimum speed between signals, while more closely spaced signals are difficult to time on streets where there is a lot of cross traffic. Pedestrian crossings should be provided at more frequent intervals.

PEAK-HOUR LANES 1.18

Peak-hour lanes are center-turn lanes or parking lanes that become travel lanes during peak traffic times. A peak-hour lane is marked like a turn lane, solid yellow on the outside and dashed yellow on the inside, with a sign – usually a red X or green arrow – above the lane to indicate whether it is open for travel. Center-turn lanes used for peak-hour travel can be reversible, with traffic switching direction based on peak period flow; dedicated reversible lanes also can be used. Peak-hour lanes can be useful in expanding bicycle and pedestrian access during non-peak times.

FIGURE 1.19
PARKING/FLEX LANE
Tinley Park, IL

FIGURE 1.20
EMERGENCY RESPONSE VEHICLE
Chicago, IL

COORDINATION WITH PARKING/FLEX LANES 1.19

In most cases, parking lanes should not be used as bicycle lanes, because these shared lanes encourage unpredictable movements by cyclists as they swerve around parked cars. In some instances, however, parking-bike flex lanes can have useful applications and can facilitate more efficient traffic flow. For example, in many residential corridors, most residents park their cars in private driveways and garages, and on-street parking is used only occasionally, mostly by visitors and delivery vehicles. In these neighborhoods, a parking-bike flex lane, marked by a solid white line 7 feet off the curb face, can be a practical solution that promotes bike riding while meeting residents' intermittent needs for on-street parking.

COORDINATION WITH EMERGENCY VEHICLES 1.20

Fire professionals, police officials and ambulance services are key stakeholders in the implementation of Complete Streets policy and should be included in all review processes. They can provide unique perspective on the uses and demands of corridors in the areas they serve.

At present, work is under way to integrate progressive street design with existing standards for fire truck access as outlined in the International Fire Code (IFC). The Congress for New Urbanism has proposed amendments to the IFC that address the need to maintain access for fire trucks, while also reflecting research showing that wider streets lead to higher traffic speeds and increased risks of fatal collisions. Although this initiative has not yet achieved revisions to the IFC, the Code does give local service providers flexibility to review and approve traffic calming measures and other exceptions. (Because police cars and ambulances are smaller than fire trucks, they do not pose the same design concerns.)

Conflicts with existing fire codes may be resolved through a thoughtful review of proposed design changes. For example, because all roadway users must yield to emergency vehicles when sirens and flashing lights are activated, there is no functional difference between a roadway with two 12.5-foot traffic lanes and a roadway with two 10-foot traffic lanes and a 5-foot bike lane. A bike lane could easily facilitate the need to yield to emergency vehicles. Additionally, by expanding the grid network and providing more alternative routes, Complete Streets can help municipalities deliver emergency services more swiftly and efficiently. In one study, the City of Charlotte found that fire department service in grid areas cost about $159 per capita, compared to $740 per person in less connected areas.

See CNU Emergency Response and Street Design Initiative
http://www.cnu.org/sites/www.cnu.org/files/er_summary.pdf