

Planning Cities for People

A Guide to Prosperous, Low-Carbon Urbanization



The world's next generation of cities will need to overcome extreme challenges posed by population growth, congestion, and energy insecurity. China is experiencing the greatest urban population boom in human history, and the plans for its cities will determine whether they feature easy mobility or are plagued by traffic congestion; whether they use energy and other resources efficiently or lock in high energy consumption for decades; and even whether they are friendly and welcoming or alienate their residents. The right standards can make all the difference—and that difference will last for decades.

Chinese officials have already taken the first step by prioritizing low-carbon and eco cities. To succeed, these efforts must be guided by sustainable urban planning. This report synthesizes the best practices in urban planning from around the world into eight quantifiable principles. These principles should be refined and adapted to Chinese conditions, but when that is done, they can help ensure that Chinese cities will grow to be the most prosperous and energy-efficient cities in the world.

China's urban opportunity

China's leaders have a limited window of opportunity to plan for prosperous, livable, low-carbon cities. These cities must make public transport, walking, and bicycling their top priorities.

As China continues its impressive economic growth, unprecedented numbers of its citizens are migrating to cities, seeking greater job opportunities, income, and quality of life. Car ownership is on the rise, and China has already passed the United States as the largest car market in the world. Similar to U.S. cities in the 1950s and '60s, Chinese cities are working to accommodate the explosive growth of automobile travel by building highways, ring roads, and parking lots. However, due to China's high population density, the problems of private-car-oriented transportation are much more acute than in the lower-density cities of the West. Despite the incredible pace of road construction, traffic in Beijing is frequently at a standstill. And in Shanghai, projections show that car use will need to be restricted and transit, bike, and pedestrian mode share increased to improve mobility and bring congestion back to a manageable level.

The reality is that high-density cities cannot be designed around the car. It simply won't work. China's leaders have a limited window of opportunity to plan for prosperous,

livable, low-carbon cities. These cities must make public transport, walking, and bicycling their top priorities. Without this planning, these burgeoning cities will not reach their full potential. They will be gridlocked and polluted. The commutes of millions of people will become a daily misery, countless square kilometers of arable land will be needlessly lost, and China's powerful economic engine will stall as goods and people become mired in congestion. Chinese cities will struggle to attract the high-tech businesses and top-notch talent that are crucial to maintaining economic growth.

Benefits of sustainable urban planning

- Improve mobility
- Reduce carbon emissions
- Attract economic activity
- Improve air quality
- Preserve arable land
- Support a harmonious and prosperous society

Chinese decision makers must leapfrog over the rest of the world's urban planning mistakes and establish a new paradigm for the cities of the future. The following is a guide to get started. Compiled by a world-renowned team of urban planning experts with years of experience working in China, this booklet summarizes international best practices. When applied together, we believe the following principles will help China create beautiful, thriving cities that will be models of smart urban development for the rest of the world.

These principles depend on and reinforce each other. Together, they are a recipe for success. We hope this guide will serve as the basis for effective urban planning that suits China's specific needs.

The eight principles

- 1 Develop neighborhoods that promote walking
- 2 Prioritize bicycle networks
- 3 Create dense networks of streets and paths
- 4 Support high-quality transit
- 5 Zone for mixed-use neighborhoods
- 6 Match density to transit capacity
- 7 Create compact regions with short commutes
- 8 Increase mobility by regulating parking and road use

1

Develop neighborhoods that promote walking

Walkable streets and neighborhoods are the foundation of every great city. Walking reduces auto dependence, supports public transit, improves health, and promotes community. Simple measures—such as limiting road width, block lengths, and setbacks between buildings and sidewalks—encourage walking. Sidewalks that feature amenities like shade, benches, and street lighting also encourage foot traffic. Designing streets that are safe to cross and providing comfortable, interesting places to walk should be the first priorities for establishing livable, low-carbon cities.

Shorten street crossings and emphasize pedestrian safety and convenience.

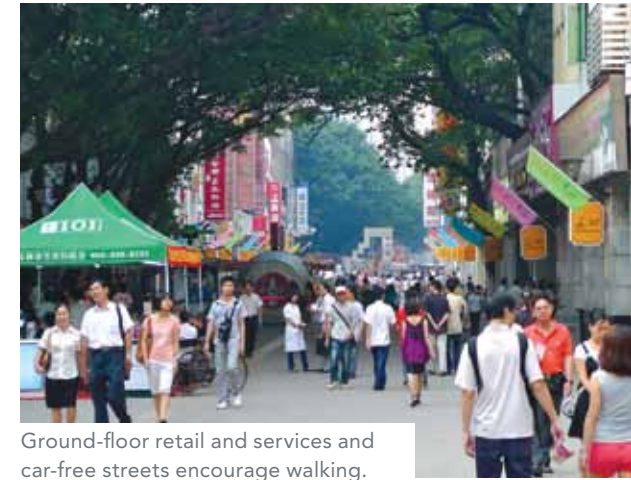
- Limit street width to 45 meters for through traffic and 25 meters for local access.
- Limit traffic speeds on local streets to 25 km per hour or less. Design streets with traffic-calming features to help enforce speed limits.

Encourage ground-level activity and create places to relax along primary pedestrian routes.

- To encourage sidewalk activity, visibility, and safety, residential developments should have multiple access points, and perimeter walls should be eliminated or replaced with see-through fences.
- Encourage sidewalk activity by zoning for varied uses; limit the distance between buildings and the sidewalk to the following averages:
 - Retail uses: 1 meter
 - Offices and businesses: 3 meters
 - Homes and apartments: 5 meters

Create direct routes and permeable blocks to shorten walking distance.

- Limit average block length to 150 meters.
- Create public paths to allow pedestrian access through existing superblock developments.
- Develop safe, well-marked, and direct pedestrian routes, at least 3 meters wide, to transit, shopping, and job centers.



Ground-floor retail and services and car-free streets encourage walking.



Design features in Hong Kong slow traffic and keep pedestrians safe.



New York City has pedestrian friendly streets throughout downtown.



Pedestrian activity, as shown here in Chongqing, China, creates community and supports businesses.

Superblock configuration



Single-use, superblock neighborhood.



Single-use, superblock neighborhoods discourage pedestrians by spacing intersections far apart and creating wide, dangerous street crossings. Pedestrians must walk long distances to reach destinations.

Suggested configuration



Neighborhood of small blocks and mixed uses in Hong Kong



Dense, mixed-use development and small block sizes encourage pedestrian activity. Smaller blocks shorten walking distances, and narrow street crossings help keep pedestrians safe.

2

Prioritize bicycle networks

In the 1980s, millions of Chinese people depended on bicycling as their primary mode of transportation. Bicycling is no longer safe or convenient in many Chinese cities. In recent years, cities across the globe have been working to reintroduce bicycles as an integral part of city life because they are a simple, inexpensive, and low-carbon way for city residents to travel between destinations, including transit stations. To ease congestion, Chinese cities must once again encourage cyclists by providing safe conditions, including bike lanes and secure bicycle parking.

Design streets that emphasize bike safety and convenience.

- Create dedicated bike lanes, at least 3 meters wide in each direction, on all streets except low-speed local streets.
- Provide secure bike parking in buildings, on streets, and at transit stations.

Create auto-free streets and greenways to encourage non-motorized travel.

- Establish car-free corridors across the city grid, no more than 800 meters apart.



Bike lanes should be protected from car traffic.



Bicycling is a key, low-cost component of any city's transportation network. Where possible, bike parking should be included at transit stations.

The Hongzhou bike-sharing system is the largest in the world.



3

Create dense networks of streets and paths

It is a common misconception that wide streets are more efficient and improve traffic flow. In fact, gated superblocks divided by wide roads actually contribute to China's traffic congestion. Case studies show that a denser network of narrower streets better optimizes traffic flow while creating more direct routes and improving safety for pedestrians. Road design should maximize human mobility rather than vehicle throughput. Narrow streets that allow one-way motor traffic as well as bicycles and pedestrians will significantly reduce congestion—and fuel use—in Chinese cities by minimizing traffic signal delays.

Create dense street networks that enhance walking, bicycling, and vehicle traffic flow.

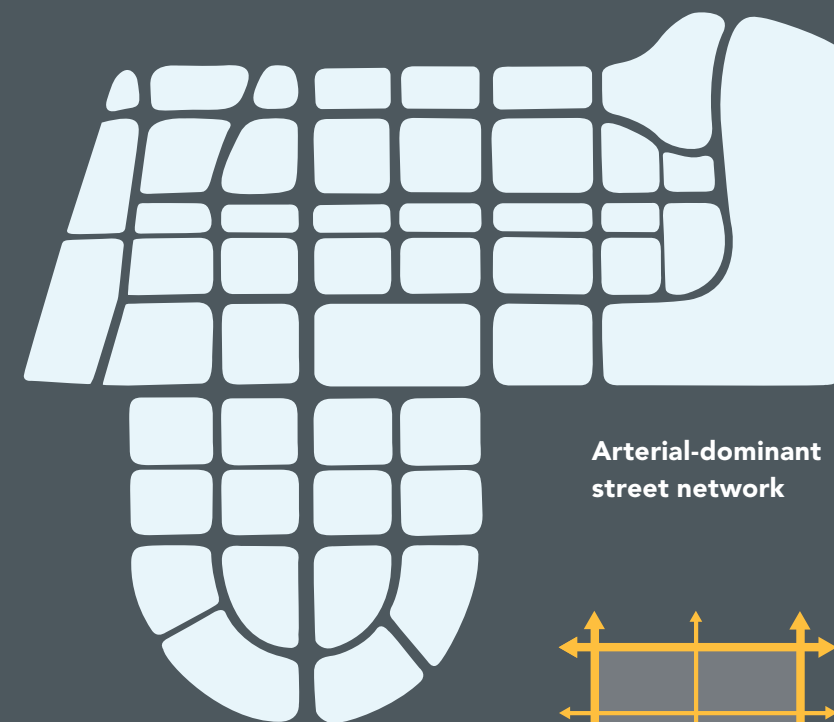
- Plan for a minimum of 50 intersections per square kilometer.
- Vary block size and street design to provide multiple options for all types of traffic.

Disperse high traffic volumes over narrow, parallel routes rather than concentrating on fewer major arterials.

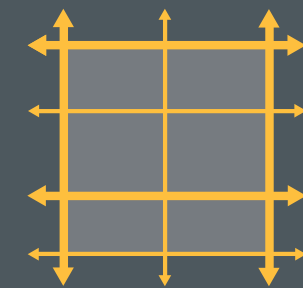
- Incorporate through roads that connect surrounding neighborhoods at least every 300 meters.
- Replace major arterials wider than 45 meters with efficient one-way couplets (in other words, divide wide arterials into two one-way thoroughfares handling traffic in opposite directions).

Discouraged: Arterial-dominant street network

- Prioritizes cars over people
- Discourages pedestrian activity



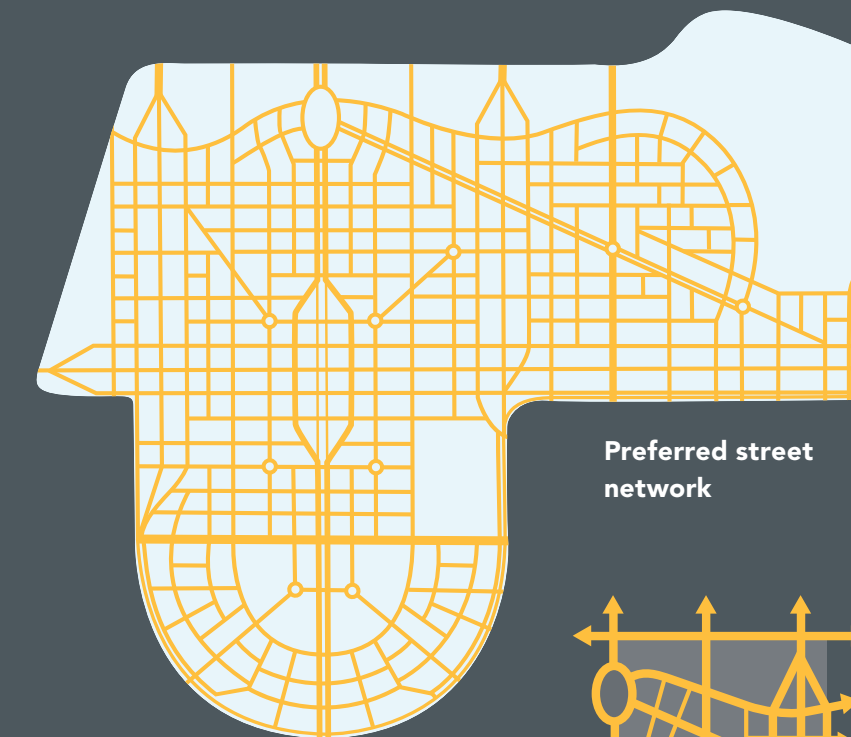
Arterial-dominant street network



Network of arterials and superblocks

Recommended: Dense networks of streets and paths

- Prioritizes people over cars
- Supports pedestrian and economic activity



Preferred street network



Network of varying street widths and block sizes

4

Support high-quality transit

Hong Kong, New York City, Singapore, and other affluent cities have the densest public transit networks in the world. While metro can be an integral part of a transit network, a growing number of cities are turning to bus rapid transit for its low cost, quick implementation, and flexible routes. Each Chinese city will need to determine the appropriate mix of transit solutions for its conditions, but cities can guarantee the overall success of their transit by providing frequent, fast, and direct service in easily accessible locations.

Ensure frequent and direct transit service.

- Establish at least one high-capacity, high-speed transit corridor every 800 to 1,000 meters with dedicated transit lanes.
- Minimize the number of transfers needed for most passengers. Provide an integrated multi modal system and ensure seamless transfers to all available transit options.

Locate transit stations within walking distance of homes, jobs, and services.

- All housing and job centers should be within 400 meters of a local transit station and 800 meters of regional transit service.



Modern BRT systems, like this one in Jinan, China, feature all the conveniences of metro systems.



Before: Guangzhou before BRT

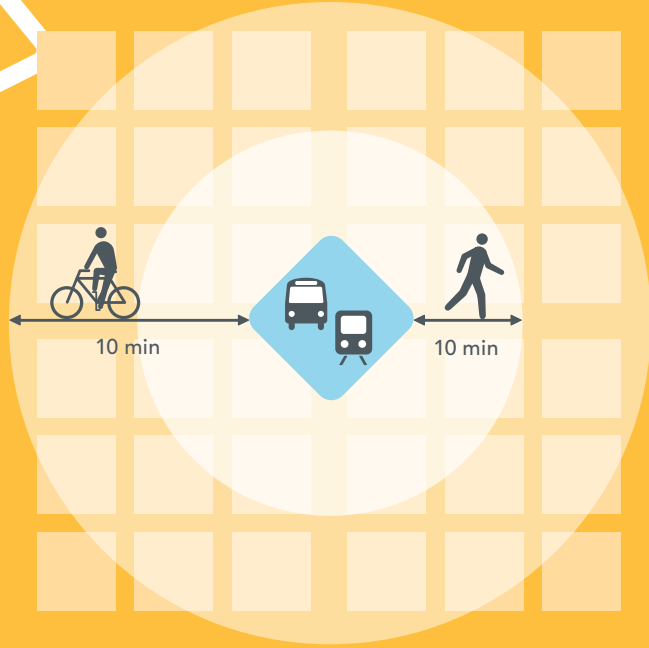
After: The Guangzhou BRT system which opened in February 2010, moves almost 27,000 passengers per hour per direction during peak commute hours, and integrates with bike lanes, metro, and other bus systems.



Guangzhou Bus Rapid transit (BRT) corridor and connecting bus and metro lines

February 2011

Ideal travel times from mass transit stations



Legend

	BRT station		BRT corridor
	Bike-sharing station		Bus line
 Kilometers			Metro line



5

Zone for mixed-use neighborhoods

Traditional Chinese neighborhoods had lively streets where children played sports and the elderly played mah-jongg. These neighborhoods had problems too, but it was the lively mix of shops and services near homes and jobs that gave these areas their charm and identity. By trading traditional housing for modern apartments, the Chinese people are losing their communities' unique sense of place and the efficiency of compact neighborhoods. China's cities of tomorrow need to combine the benefits of modern housing with the best qualities of traditional urban neighborhoods.

Encourage an optimal balance of housing and services through zoning codes.

- Housing options should accommodate a mix of income levels and age groups.
- Shops, schools, parks, and services should be located within 400 meters of housing. This includes age-specific services, such as day care.

Provide a variety of accessible parks and open space.

- Neighborhood parks should be located within 500 meters of housing; large regional parks within 1 kilometer.
- Unique natural environments and local cultural and historical assets should be preserved and creatively reused.



Parks, jobs, housing, shops, restaurants, and the Jing'an Temple are all located near the metro station.

The Jing'an Metro Station is a good example of transit-oriented, mixed-use development.

- The station is integrated with a shopping center.
- Parks, restaurants, and housing are concentrated nearby.
- Local historic buildings were retrofitted for modern uses.
- Passengers have easy access to the Jing'an Temple.



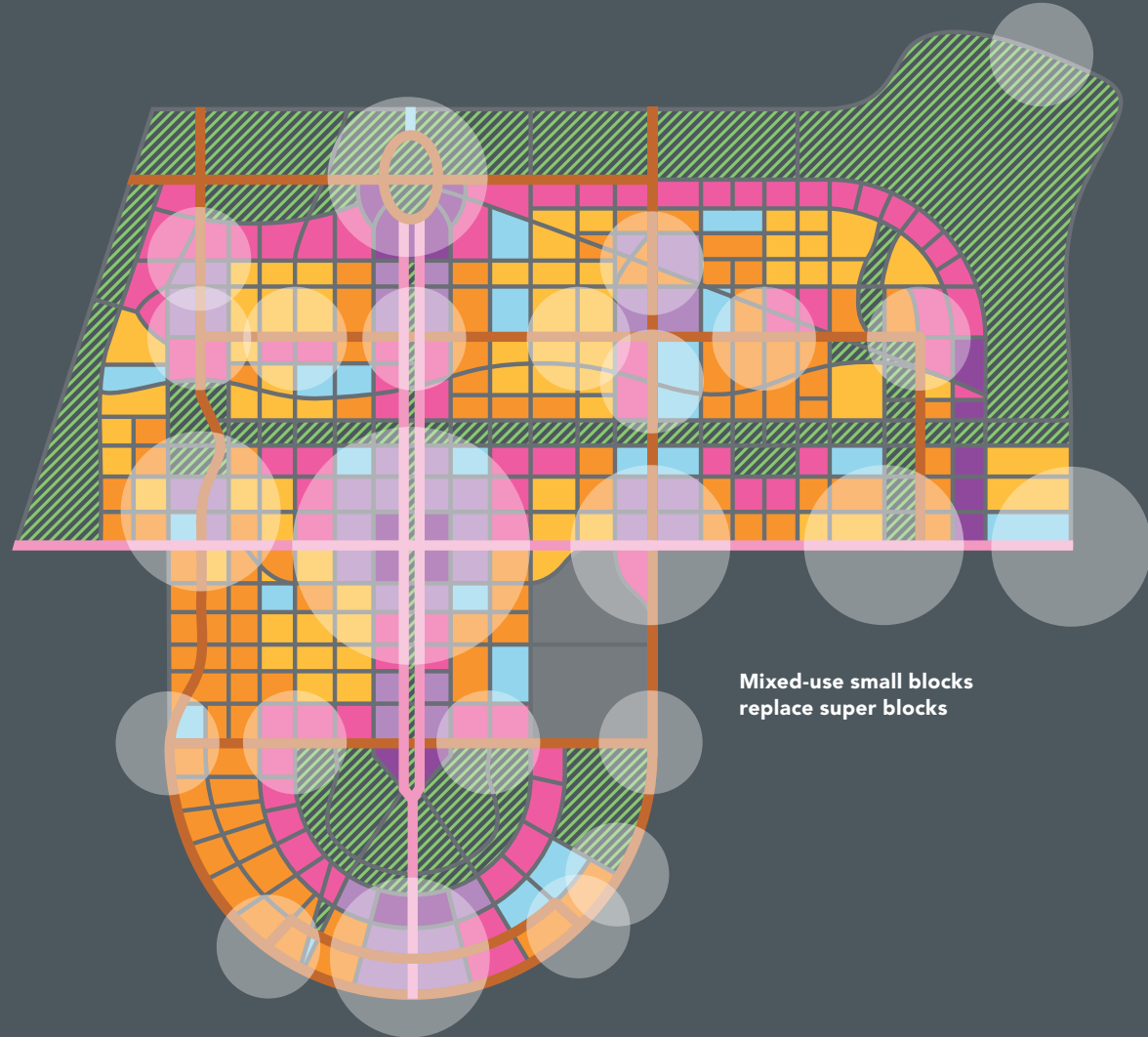
Every city should feature many parks.



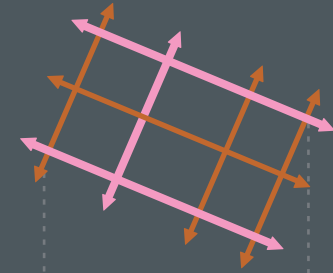
Jing'an Metro Station.

High-density hubs of various sizes cluster mixed activities across a city

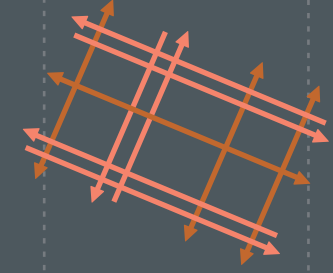
- The density and size of the center corresponds to the level of transit service.
- City, town, and village centers are located at the crossroads of transit boulevards.
- Residential neighborhoods are directly accessible to centers.



Walkable, mixed-use cities are built from a variety of street types



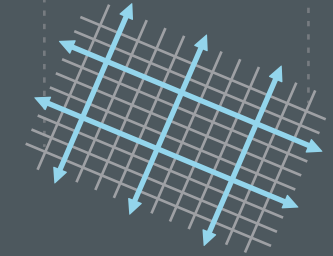
Superblocks with wide arterials before modification.



Replace major arterials with one-way street pairs and add transit to remaining arterials.



Add car free streets, some with dedicated transit lines.



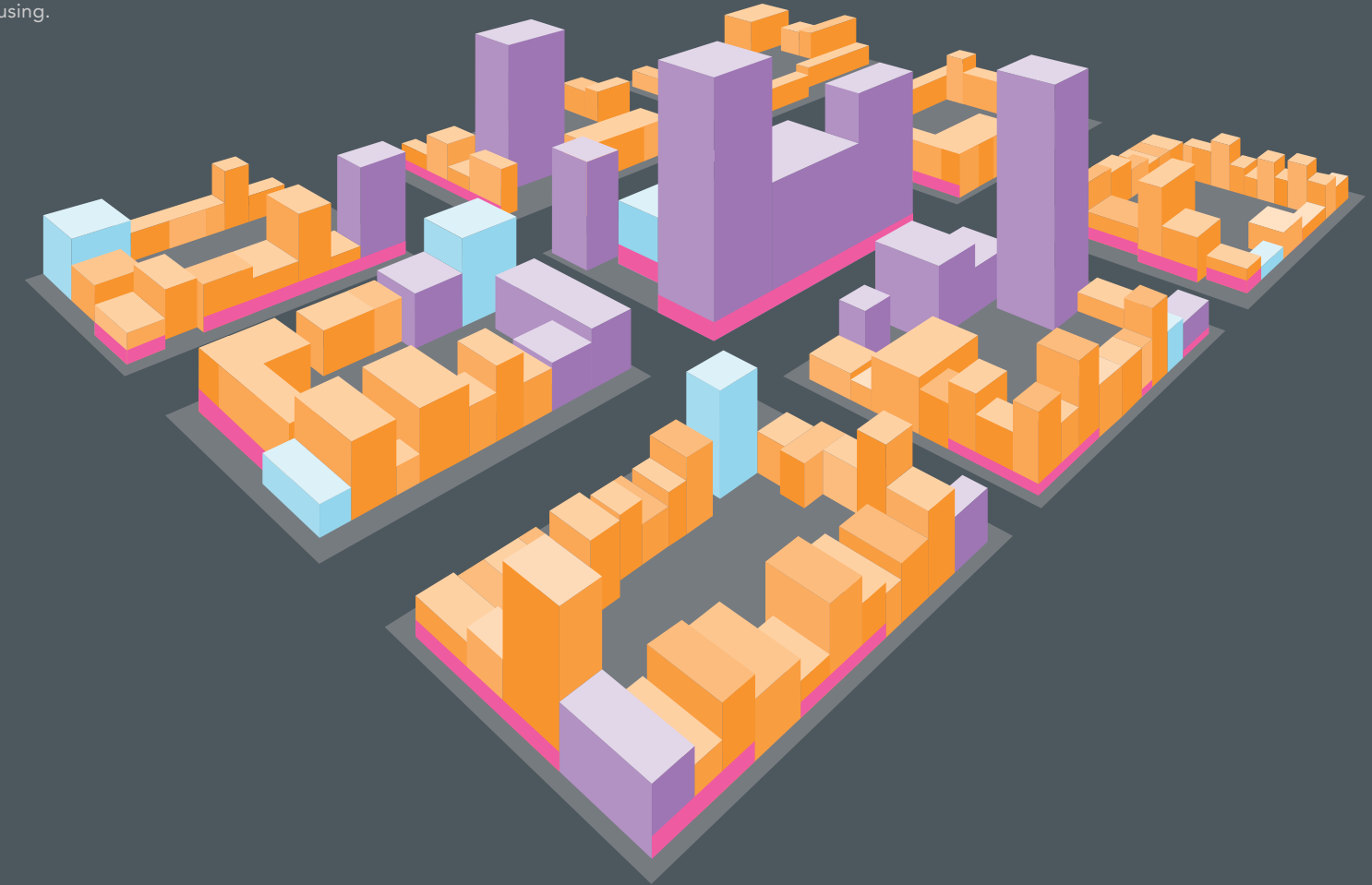
Add narrow local streets with bike lanes and sidewalks.

A walkable mixed-use neighborhood

A walkable neighborhood features a variety of uses and locates jobs, shops, and transit stations within walking distance of housing.

Legend

- Residential
- Office
- Civic
- Street level retail



Unfocused density

45% of jobs and homes in area are within walking distance of station.



Transit-oriented density

80% of jobs and homes in area are within walking distance of station.



6

Match density to transit capacity

High density is crucial to low-carbon cities, but density alone is not enough. In order to avoid congestion, housing must be located close to public transit and jobs. Density also needs to be related to the capacity of all modes of transportation. If roads are designed as suggested in this guide—with bike and pedestrian-friendly corridors, transit priority lanes on major arterials, and one-way arterial couplets—activities can be concentrated to make walking, cycling, and mass transit more convenient than driving. This will shorten trip distances, save travel time, and preserve millions of square kilometers of arable land.

Match density to the maximum peak-hour capacity of a transit system.

- Both residential and commercial density should be designed to match the area's peak commute transit capacity.
- Major job centers should only be located where high-volume transit services are available.

In key employment areas, zone for mixed-use districts that combine everyday uses.

- A mix of recreation, services, and retail should be located in employment areas to provide for workers' daily needs.



In Curitiba, Brazil, high-rise development is focused within 200 meters of mass transit lines.



In Guangzhou, density is focused around the BRT corridor. The system's capacity matches commute-hour transit demand.

7

Create compact regions with short commutes

Community location has a long-term impact on sustainability. New city centers placed far from existing cities are inconvenient and rarely thrive. City planners can avoid this by locating compact new sub-centers within or adjacent to existing cities. In addition to protecting arable land, this strategy significantly decreases the cost of providing transit, utilities, and other services to these new locations, while reducing most residents' daily commute.

Reduce sprawl by focusing development in areas adjacent to and within existing cities.

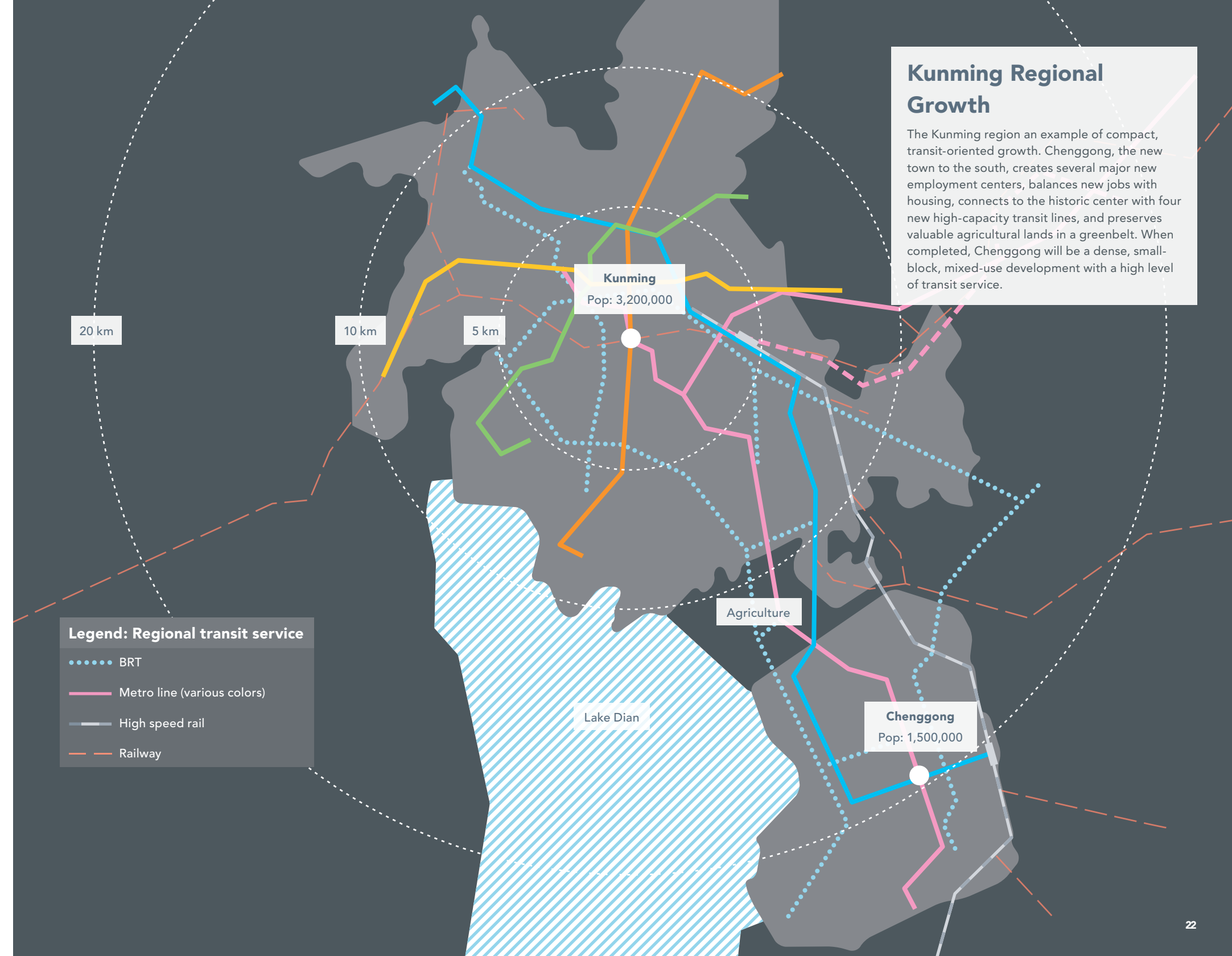
- Regional development should seek a compact footprint through preservation, reuse, and infill of existing areas, balanced with dense areas of new growth.
- Where possible, new development should avoid agricultural lands and other environmental assets.

Create a jobs/housing balance within a short commute distance.

- Decentralize job centers and aim to limit commutes to approximately 5 kilometers or 15 minutes.
- Create smaller decentralized job centers that encourage reverse commutes.

Kunming Regional Growth

The Kunming region an example of compact, transit-oriented growth. Chenggong, the new town to the south, creates several major new employment centers, balances new jobs with housing, connects to the historic center with four new high-capacity transit lines, and preserves valuable agricultural lands in a greenbelt. When completed, Chenggong will be a dense, small-block, mixed-use development with a high level of transit service.



8

Increase mobility by regulating parking and road use

Avoiding gridlock requires limiting the use of vehicles to levels that the road network can support. Peak commute-hour car trips are often unnecessary and should be discouraged. There are many ways to discourage driving. London, Hamburg, and Zurich, for example, restrict parking in popular destinations served by public transit. Singapore and Stockholm have implemented road-use charges. Chinese cities should consider these strategies—which complement the above principles—to help relieve their congestion problems.



Limit parking in key employment districts to discourage driving during peak traffic periods.

- Limit parking ratios in employment areas to 0.2 stalls per worker.
- Eliminate long-term street parking to ease congestion and reduce street width.
- Remove all parking-space minimums for residential buildings and establish citywide parking-space maximums consistent with targets for private car use.

Adjust car fees by time of day and destination.

- Institute a congestion-management system that limits auto use in key urban and employment districts at peak traffic hours.
- Charge tolls for use of overloaded roads and bridges and use the fees to support transit.
- Vary parking charges by time of day and location to insure high turnover.

Road pricing reduces congestion and raises money for local government: Some facts from Singapore and London.

80,000

kilograms of CO₂ emissions reduced in Singapore's traffic congestion zone

37 330

percent more Londoners are riding buses into the city during toll times than before congestion pricing

million yuan in annual revenue raised by Singapore's traffic congestion zone program

65

million yuan annual operation cost for the traffic congestion zone program in Singapore

50

percent decline in bus delays in London

85

percent of people entering London when tolls are charged now take public transit

20

percent increase in Singapore commuters using public transit

30

percent decrease in congestion since congestion pricing was implemented in London



Rendering of Chenggong

Applying the principles in Chenggong, a low-carbon new town

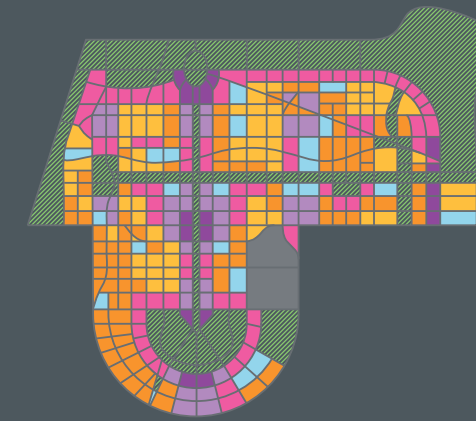
Chenggong is a new town planned for the next stage of Kunming's next generation of growth. It is currently the administrative center for the greater Kunming region and includes Yunnan University, a major new center for education and research. While its original plan embraced many best practices

for ecological design, its urban form followed typical superblock patterns with large single-use areas. Its central district, projected to house 230,000 residents and approximately 200,000 jobs, has been redesigned according to the eight principles described here.

The plan for Chenggong: The principles have been combined to create a mixed-use, walkable, and livable town.

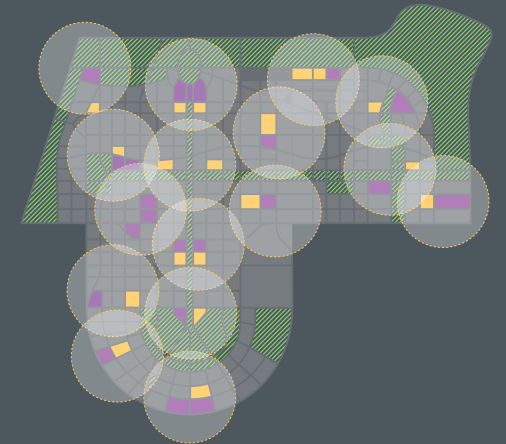
Mixed uses and small blocks

Small blocks and mixed uses replace typical superblocks to create a more walkable community. The greater street density improves pedestrian access and disperse traffic.



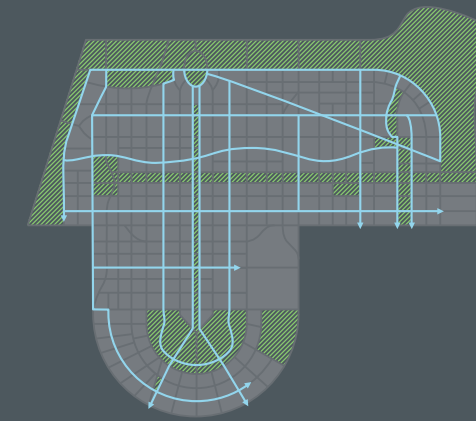
Walkable neighborhoods

Each neighborhood has a roughly 500-meter walking radius, centered on local parks, schools, and other civic uses.



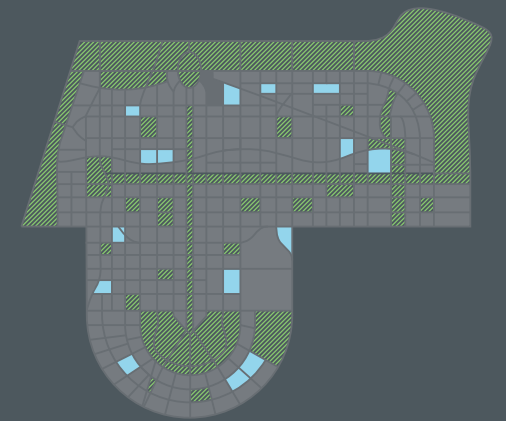
Auto-free streets

A network of car free streets, some with bus access, others for bikes and pedestrians, are spaced no more than 800 meters apart throughout the town.



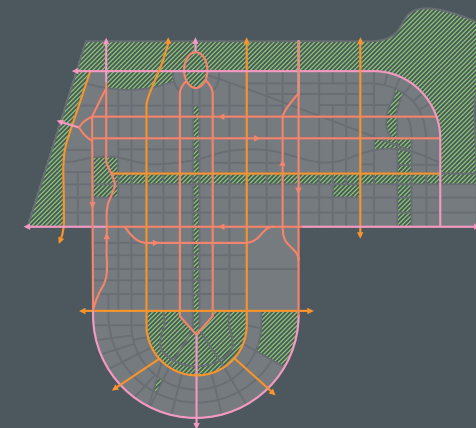
Accessible parks

Linear greenways, neighborhood parks, and larger community parks are located throughout the plan and are easily reached by car-free streets and quiet local roads.



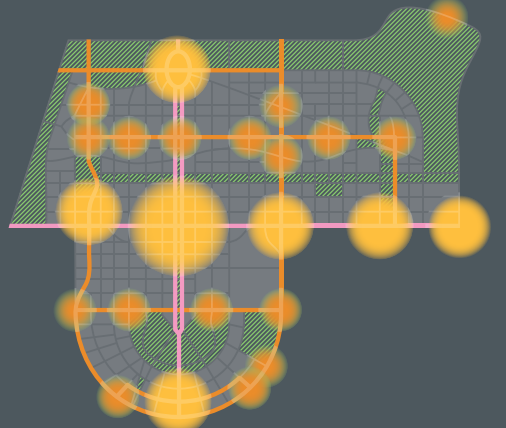
Paired one-way streets and narrow arterials

Through traffic is carried on streets no wider than 45 meters. Higher-volume traffic is diverted onto one-way street pairs, no more than 30 meters wide in each direction to allow easy pedestrian crossing.



Transit-oriented development

Areas with high levels of transit service, such as the crossing of two metro or BRT lines, have higher density, more commercial development, and a greater mix of uses.



The principles introduced here represent what some of the world's leading experts believe to be best practices in urban design. Cities are gradually adopting these measures, but those that have embraced them are the most livable and economically secure cities in the world.

These principles support each other. Blocks with mixed uses encourage walking, and walkable cities create customers for local businesses. Smaller block sizes encourage bike and pedestrian use, which cuts down on traffic, allowing public transit and automobile traffic to run better—and so on. Enacting all eight principles is the key to a sustainable, livable city.

While these principles are a synthesis of international best practices, China's challenges and opportunities

are unique. Many of these recommendations are not consistent with current planning rules and regulations. It is time to apply cutting-edge scientific thought about what makes cities successful and to reexamine our cities in light of this most recent understanding. China has the resources and vision to leapfrog over the rest of the world and create the best cities of the future. Now is the time to seize this opportunity and lay the foundation for a healthy future.

The ClimateWorks Foundation brought together the organizations represented here. We hope this document will serve as the beginning of a dialogue in which we can work together to ensure that the cities of tomorrow are the best possible cities for China—and the world.

