

Reshaping the City

Innovations for Sustainable Mobility

Trent Lethco, Associate Principal, Arup

August 5, 2011



Arup

Who we are

- Technically-based solutions
- Systems approach
- Innovation
- Experience
- Leadership in sustainability

Global Network





C40
CITIES
CLIMATE LEADERSHIP GROUP



CLINTON
FOUNDATION

CLINTON
CLIMATE
INITIATIVE

Do Today's Conditions Determine Tomorrows Future?

What can we learn from the United States?

Emergence of US Interstate System

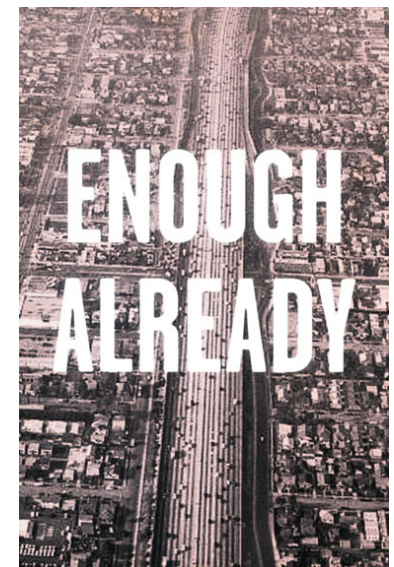
- **Federal Interstate Highway Act**
- **GI Bill**
- **State and Federal Gas Taxes**
- **Elimination of transit operating funds**
- **Little support for bike and ped programs**
- **Suburban Priority**



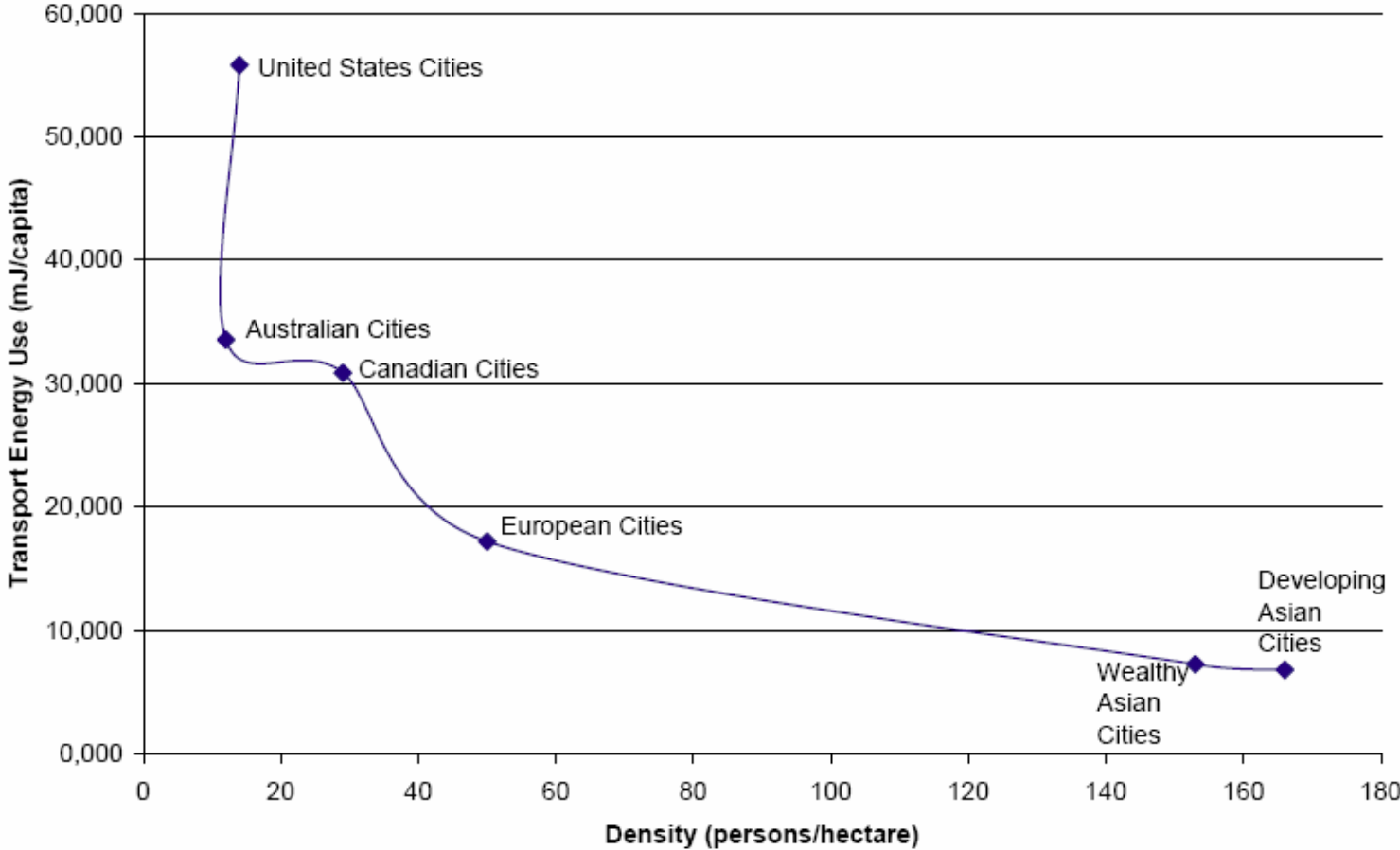


1991 – A Change In Direction

- **Integrated Surface Transportation Efficiency Act for the 21st Century**
- **20 years of progress**

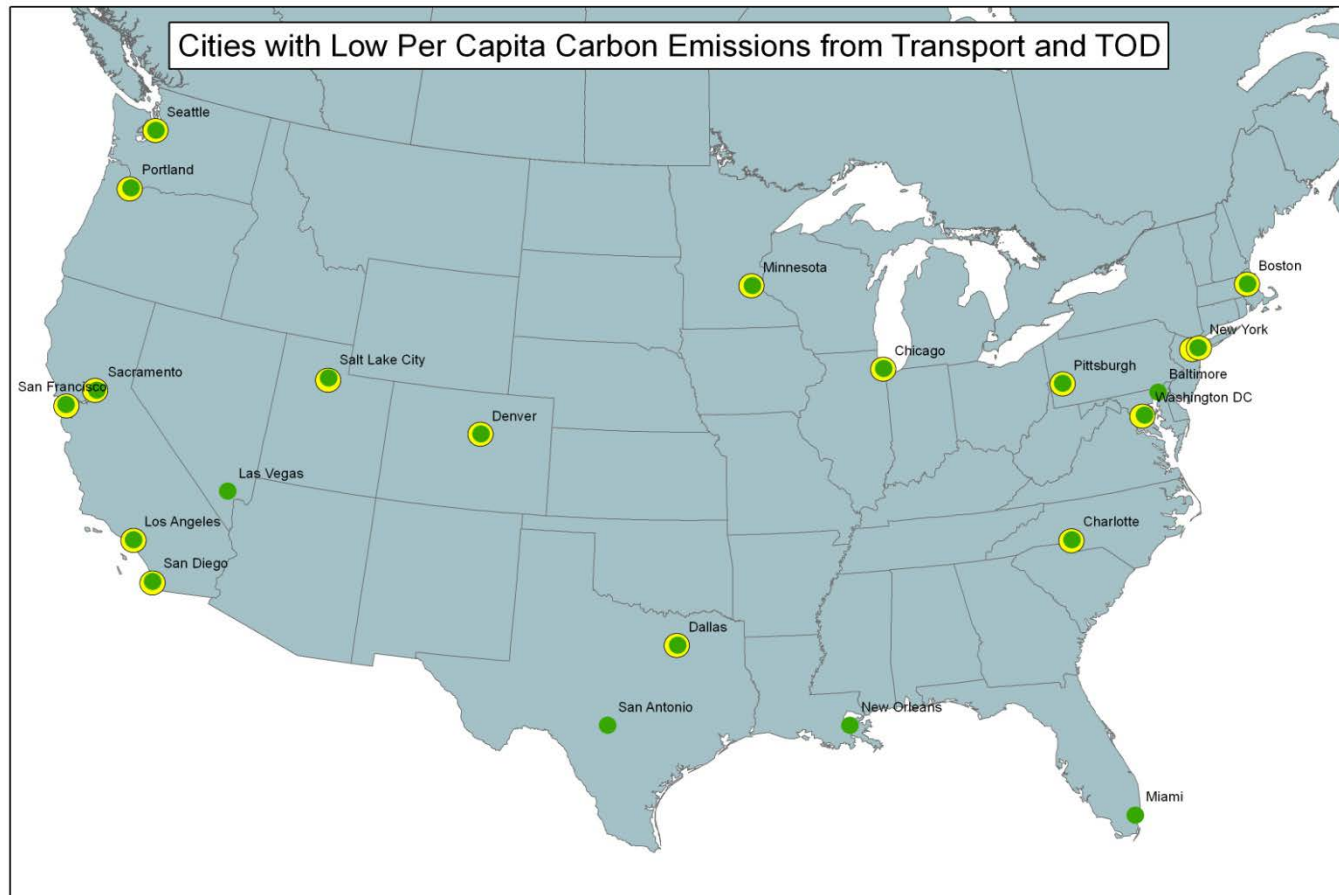


Transport Energy Use Per Capita



Kenworthy and Laubre, Transportation Quarterly, Vol. 53, No. 4, Fall 1999

Signs of Hope



Leaders Speak of Their Own Issues at a Conference Addressing Food Shortages

By ELISABETH ROSENTHAL and ANDREW MARTIN

ROME — It was supposed to be an emergency conference on food shortages, climate change

izers. But it did little to improve agriculture in some of the poorest parts of the world, particularly Africa, where harvests have remained stagnant under the pres-

He said that when food prices were low, in recent decades, Ecuador had stopped producing its own wheat, corn and soy — favoring cheap imports instead. But prices of these commodities have doubled in the past

Mr. de Silva attacked the “absurdly protectionist farm policies in rich countries,” a clear reference to the United States, which protects its own corn ethanol from competition with Brazilian ethanol, made from sugar cane.

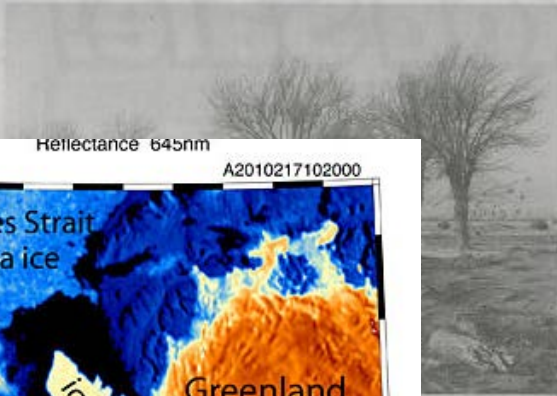
The discussion is not focused on the need of countries and poor people,” said José María Sumpsi, assistant director general of the organization. “But you have to take into account that you are hearing the positions of the gov-

“I doubt there will be a positive agreement on biofuels” from the conference, said Mr. Schafer, the American agriculture secretary, though he indicated that some “acceptable” language would be in the meeting’s final document.

Governor Declares Drought in California and Warns of Rationing

By JENNIFER STEINHAUER

LOS ANGELES — In reserve since 1992, California has officially been in drought, Gov. Arnold Schwarzenegger said Wednesday, warning that the state might be forced to ration water to cities and regions if conservation efforts did not improve.

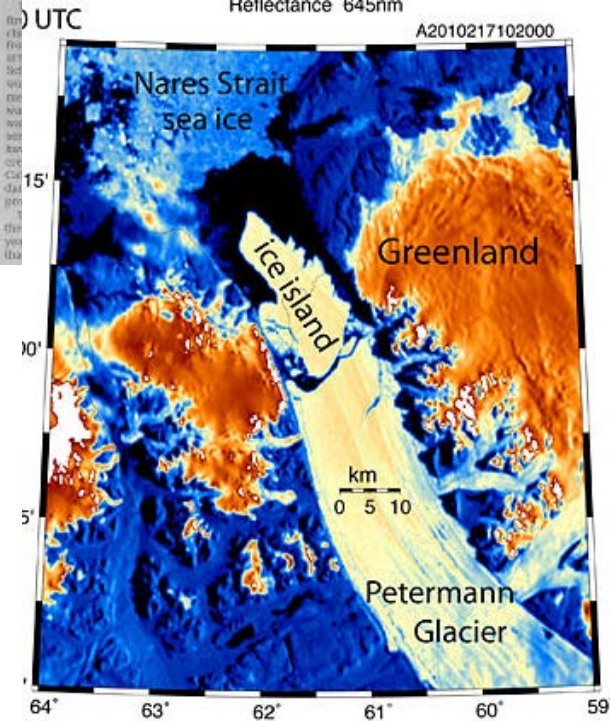


A state is trying to head off an emergency.

which requires Senate approval, puts most of the state on rationing, and tithes on the agriculture industry, underscoring tension over conservation between city dwellers and farmers, who consume most of the state's water.

Across the state, many districts and municipalities are instituting or considering recycling, rationing and higher fees for excessive use. For instance, Los Angeles officials recently announced their intention to begin using heavily cleaned sewage to increase drinking water supplies.

The East Bay Municipal Utility District and the Long Beach Water Department, serving districts at opposite ends of the state, have



Myanmar Junta Begins Evicting Cyclone Victims From Shelters

Myanmar Junta Begins Evicting Cyclone Victims From Shelters





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Cedar Rapids struggling 9 months after flood

Updated 3/23/2009 2:42 PM | Comments 107 | Recommended 24 | E-mail | Save | Print | Reports & Permissions | RSS

By Judy Keen, USA TODAY

CEDAR RAPIDS, Iowa — The record floodwaters that engulfed this city last June receded long ago. Parts of the city buzz with activity again. Workers are rebuilding the railroad bridge that collapsed into the Cedar River.

For thousands of people, though, the disaster continues. "It amazes me that people think the flood is over," says Amy Wilkinson, whose home was flooded. "It's still very much here."

PHOTO GALLERY: Cedar Rapids rebuilds despite chance of flood

STORM CENTER: The latest weather news

Eight months after flooding devastated swaths of the Midwest, the city that suffered the most harm — 5,300 houses and 700 businesses were damaged or destroyed — is struggling.

Entire neighborhoods are empty. About 1,300 homes in this city of 125,396 will be razed because they're in flood plains or unsafe. There are "for sale" signs on others whose interiors are gutted.

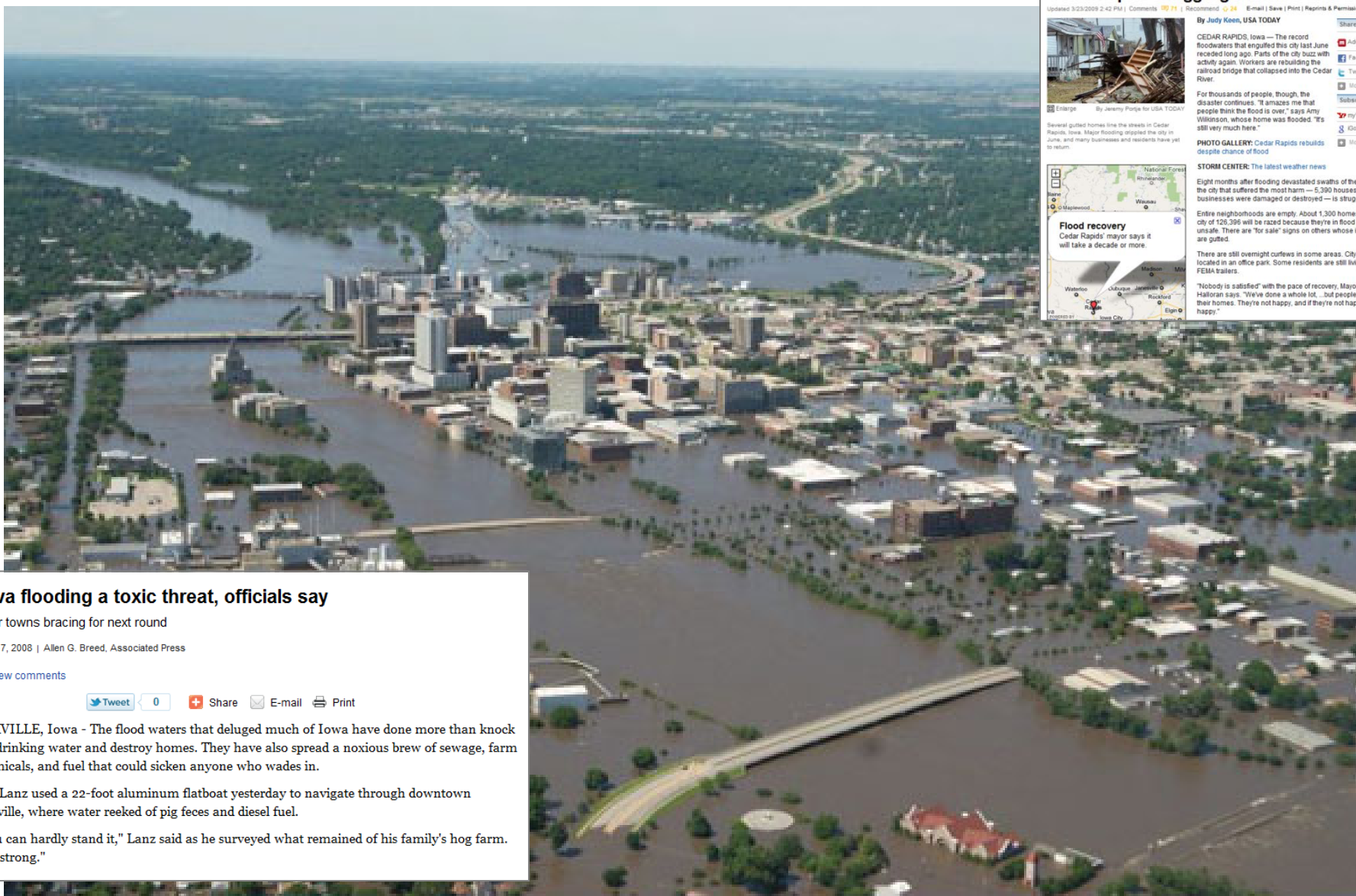
There are still overnight curfews in some areas. City Hall is still located in an office park. Some residents are still living in FEMA trailers.

"Nobody is satisfied" with the pace of recovery, Mayor Kay Hatman says. "We've done a whole lot... but people are out of their homes. They're not happy, and if they're not happy, I'm not happy."

Enlarge By Jeremy Pappas for USA TODAY

Several gutted homes line the streets in Cedar Rapids, Iowa. Major flooding erupted the city in June, and many businesses and residents have yet to return.

Flood recovery
Cedar Rapids' mayor says it will take a decade or more.



Iowa flooding a toxic threat, officials say

River towns bracing for next round

June 17, 2008 | Allen G. Breed, Associated Press

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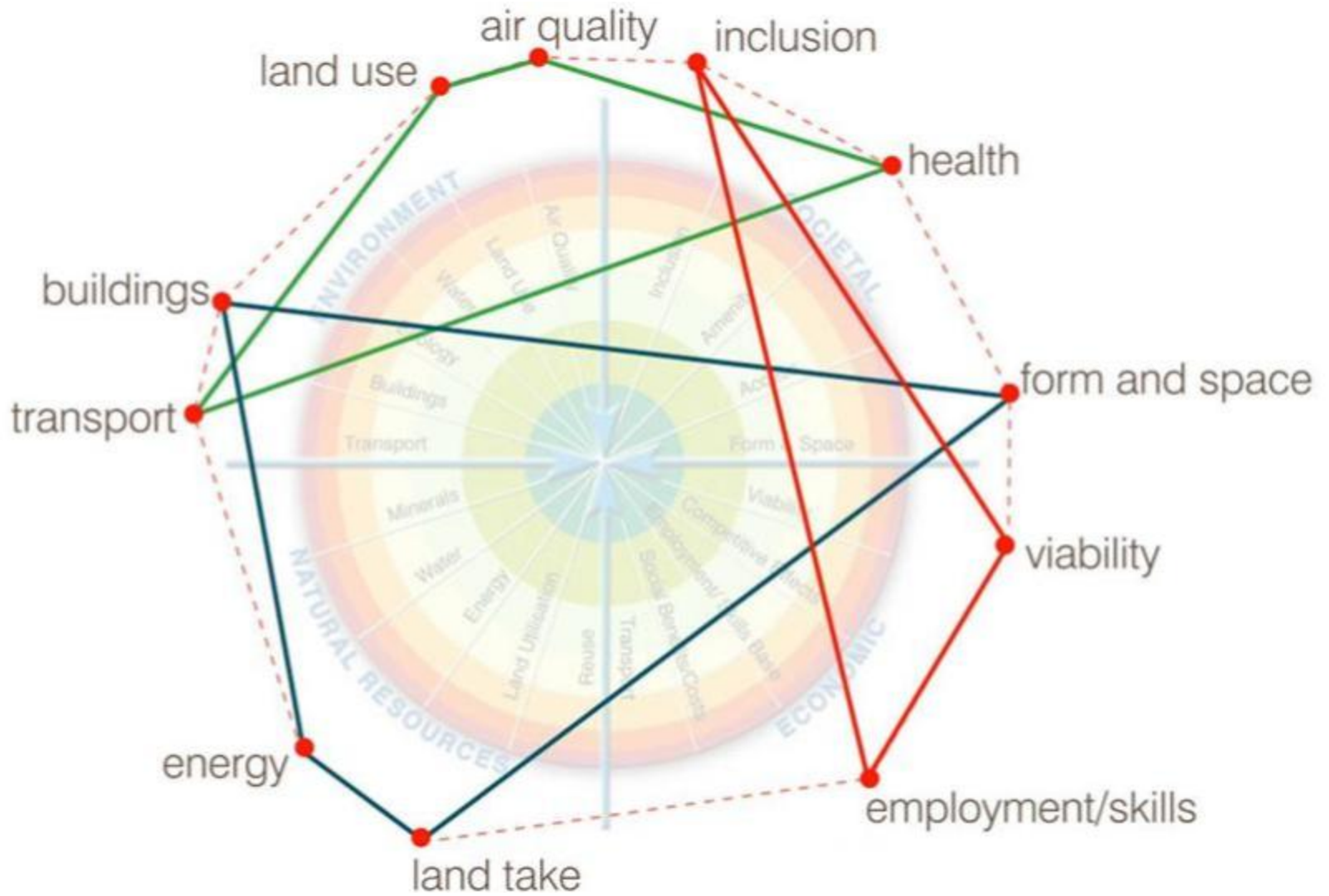
OAKVILLE, Iowa - The flood waters that deluged much of Iowa have done more than knock out drinking water and destroy homes. They have also spread a noxious brew of sewage, farm chemicals, and fuel that could sicken anyone who wades in.

Bob Lanz used a 22-foot aluminum flatboat yesterday to navigate through downtown Oakville, where water reeked of pig feces and diesel fuel.

"You can hardly stand it," Lanz said as he surveyed what remained of his family's hog farm. "It's strong."

Plan A Different Future

If you plan cities for streets and cars, you have cities for streets and cars. If you plan cities for people and places, you have cities with people and places.



Approach

Integrated



Measurable



9 RESTORING & ENHANCING ECOSYSTEMS LANDSCAPE, ECOLOGY AND NATURAL ENVIRONMENTS

CURRENT PERFORMANCE OF

35% OF LAND ALLOCATED AS
NATURAL OPEN SPACE *

CURRENT PERFORMANCE OF

32 new HECTARES AS HABITAT OF
BIODIVERSITY IMPORTANCE *

- Network of green corridors promoting ecological connectivity
- Ebbsfleet Biodiversity Action Plan in line with Kent's Biodiversity Action Plan
- Species championing and auditing, attaining the Wildlife Trust's Biodiversity Benchmark and Business in the Environment Reporting
- Ecological interpretative trails, such as native trails

* (4 planning quarters = 1.78ha, Total ha. of biodiversity importance = 44.2 ha). Existing area 23.5ha. At this stage some of the new habitat has been designated as having a 50% value for biodiversity.



10 WATER EFFICIENCY & SITE WIDE INTEGRATED WATER MANAGEMENT WATER

1:100 YEAR
+ **climate change**
FLOOD PROTECTION

105
& **80 litres** OF WATER/PERSON DAY
(FOR HOUSEHOLDS) *

- Reductions in potable water achieved via water efficient fittings and appliances (achieving 105 l/pp/day) as well as rainwater collection / grey water recycling (achieving further reductions of up to 80 l/pp/day).
- Surface water runoff will be managed to minimise the risk of flooding and maximise the amenity value on site and in the river.
- Water features play a central role in the definition of the identity of the place and landscape character. The River Ebbsfleet is a central piece of the design, with possible use of Blue Lake as a recreational resource.
- Sustainable Drainage Systems focused on the River Ebbsfleet, avoiding potential pollution of the underlying aquifer.
- Irrigation demand will be limited by appropriate choice of planting and use of advanced irrigation systems.

* Targets related to levels 3, 4 and 6 of the Code for Sustainable Homes. This is compared to the UK average of 150 l/pp/day. Preliminary analysis suggests an expected performance of 87 l/pp/day. For the initial phases and 76 l/pp/day for the later phases. Final strategies are still under consideration, and will be refined during the development of the Ebbsfleet Design Codes.



11 A RESPONSIBLE APPROACH TO MATERIAL RESOURCES NATURAL RESOURCES, WASTE AND MATERIALS

TARGET OF

90% OF CONSTRUCTION WASTE
TO BE REUSED/RECYCLED /
RECOVERED

TARGET OF **20**
to **30%**
OF CONSTRUCTION MATERIALS
WITH RECYCLED CONTENTS

- 100% source segregation of waste and automated waste collection via Envac system (under consideration)
- On-site composting scheme
- Education program on waste minimisation, collection, and separation
- Construction and demolition waste to be reused and recycled
- Sustainable procurement policy required for all contractors and suppliers

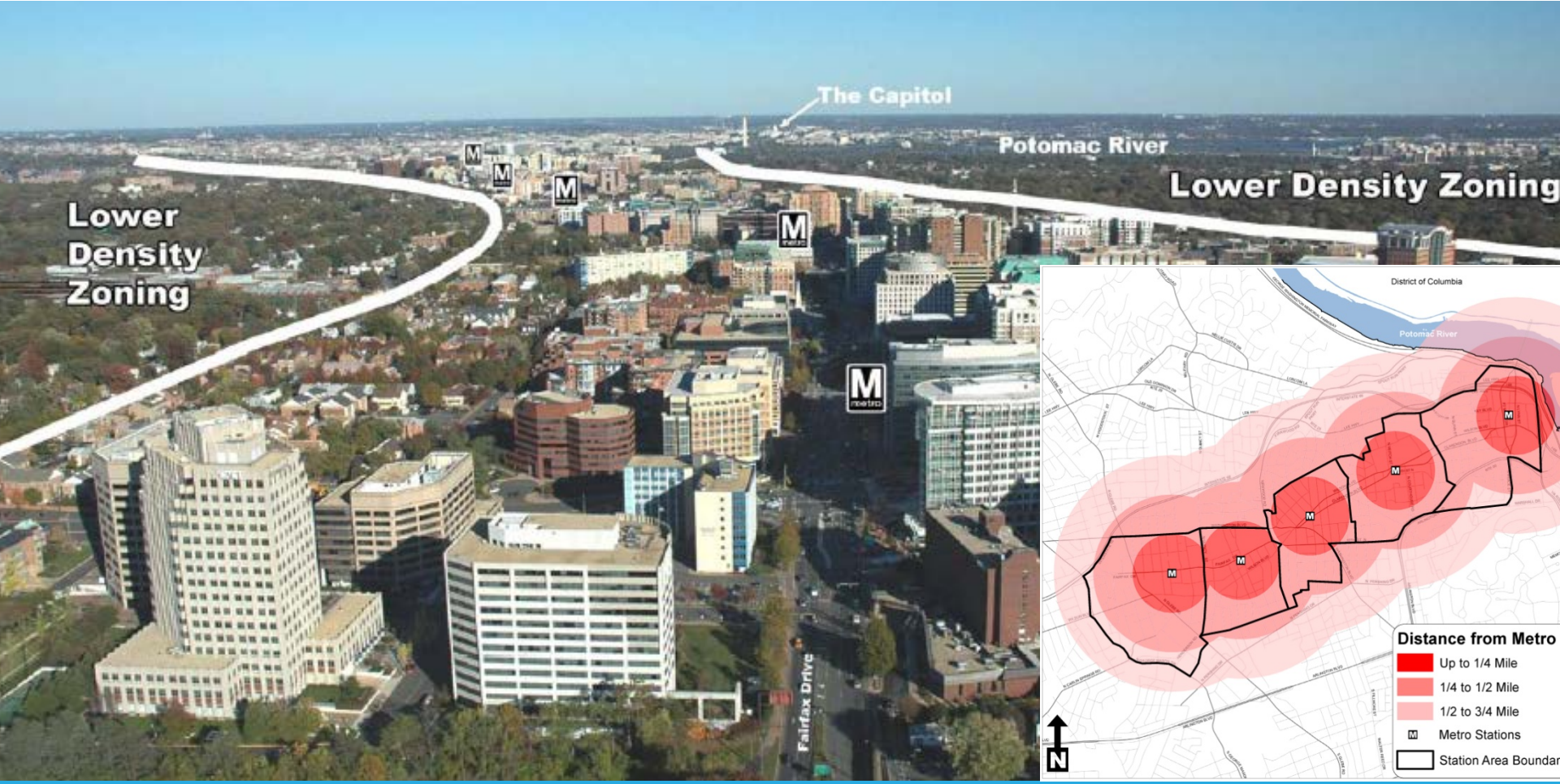


Approach

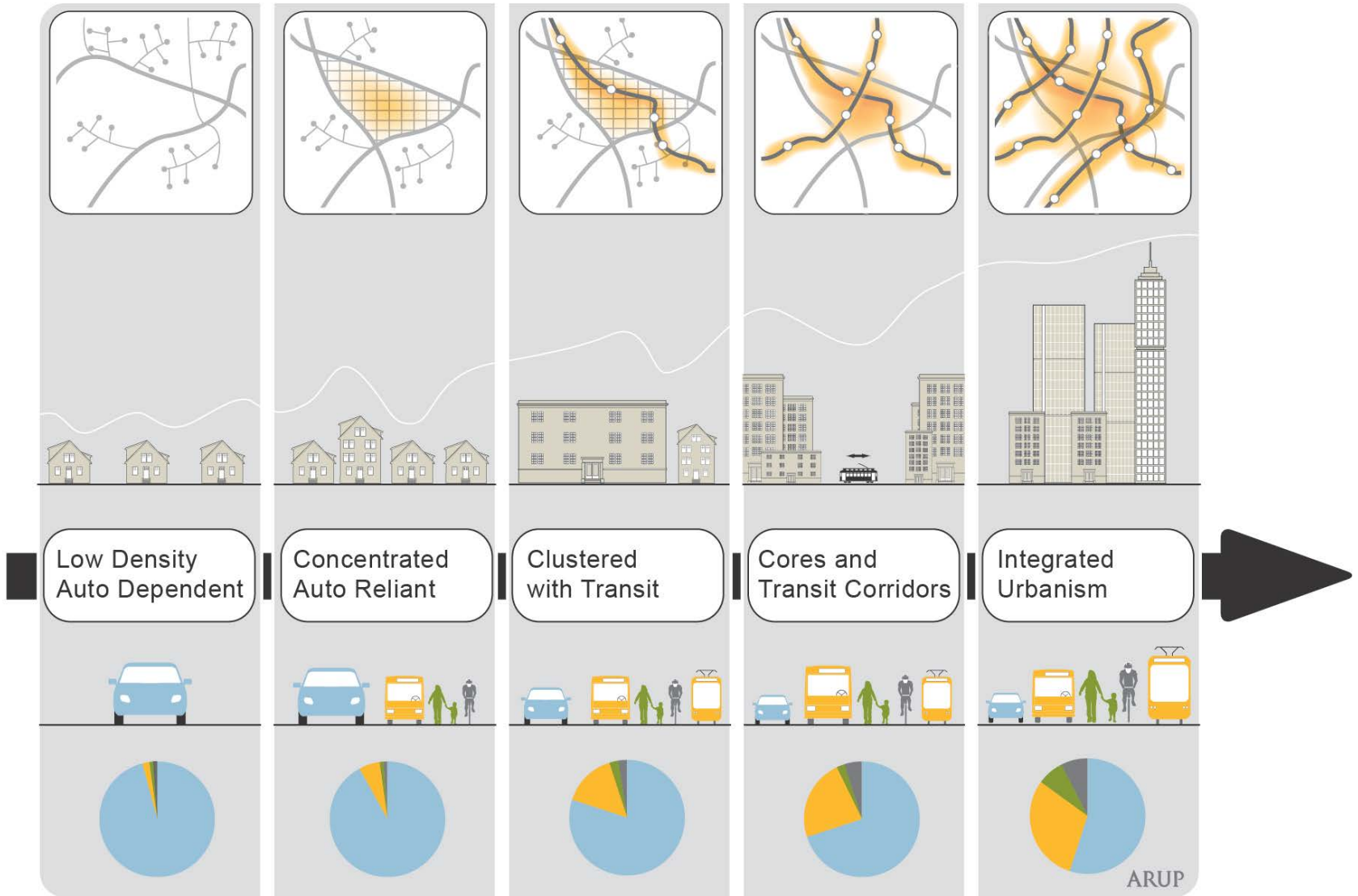
Meaningful



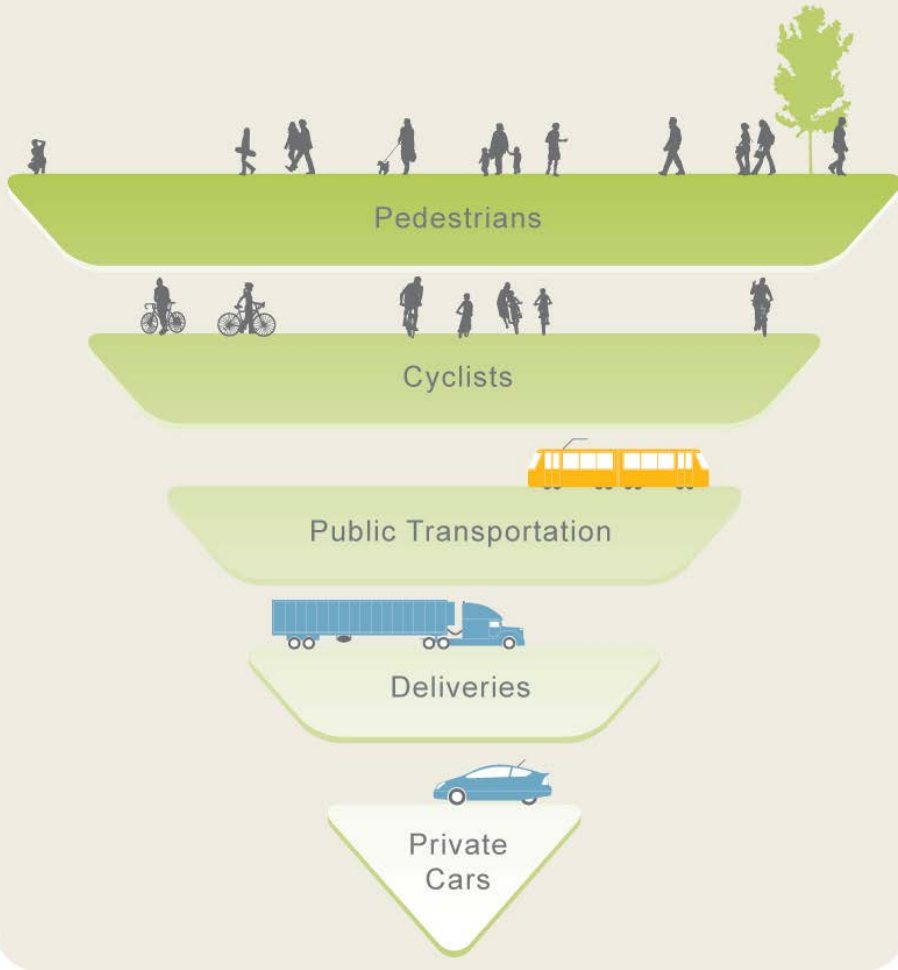
Linking Transportation and Land Use



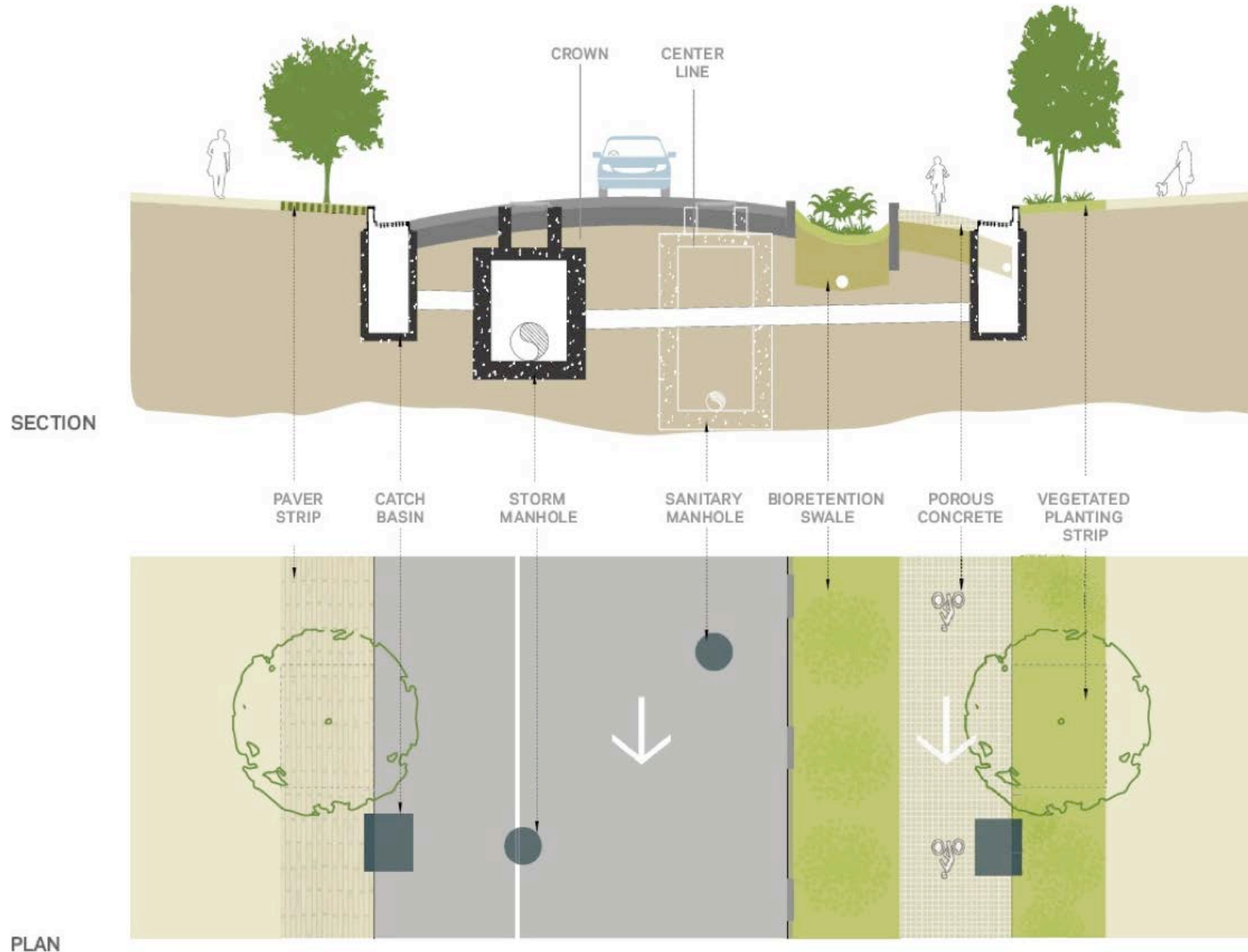
Transportation and Land Use Integration



Model for a Human-centered Transportation System



Green Streets

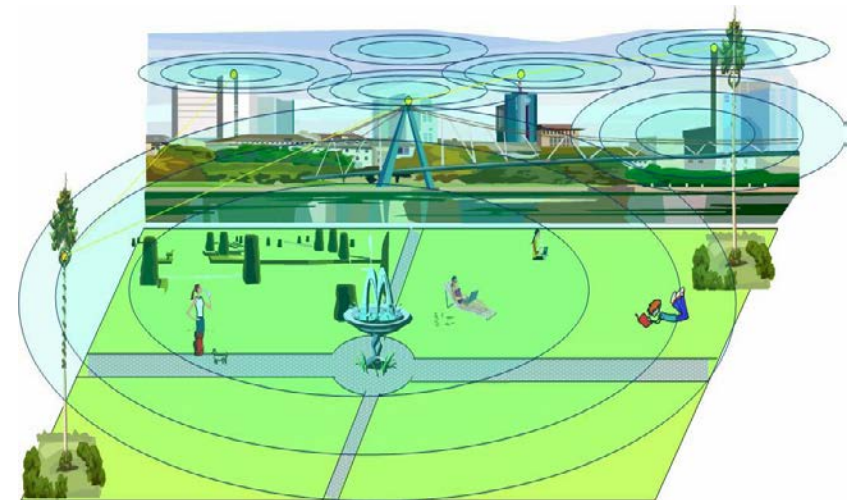


Thoughtful Street Design



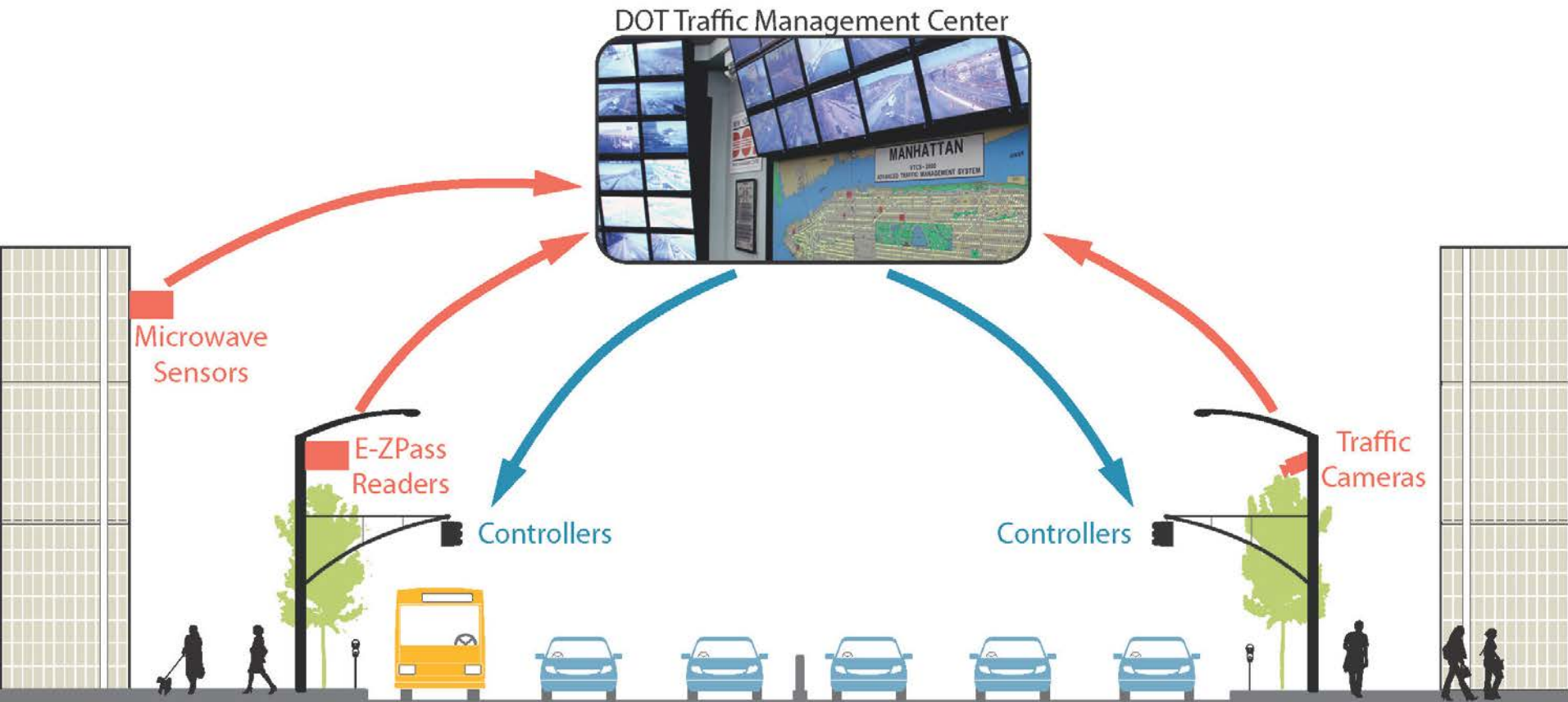
Urban Information Architecture

- **Intelligent Transportation**
- **Intelligent Buildings**
- **Intelligent Safety and Security**
- **Intelligent Energy**
- **Citizen Experiences**
(e.g., Healthcare, Education, etc.)



Traffic Management

- Collect real time information
 - Microwave motion sensors
 - Traffic video cameras
 - E-ZPass readers
- Control traffic signals in real time
- Respond to current conditions



Reclamation and Pocket Parks



Informative Art



Places of Interest



Legible Wayfinding





Case Studies

Site: Yonsan International Business District. Seoul, South Korea

District: Manhattan. New York City. USA

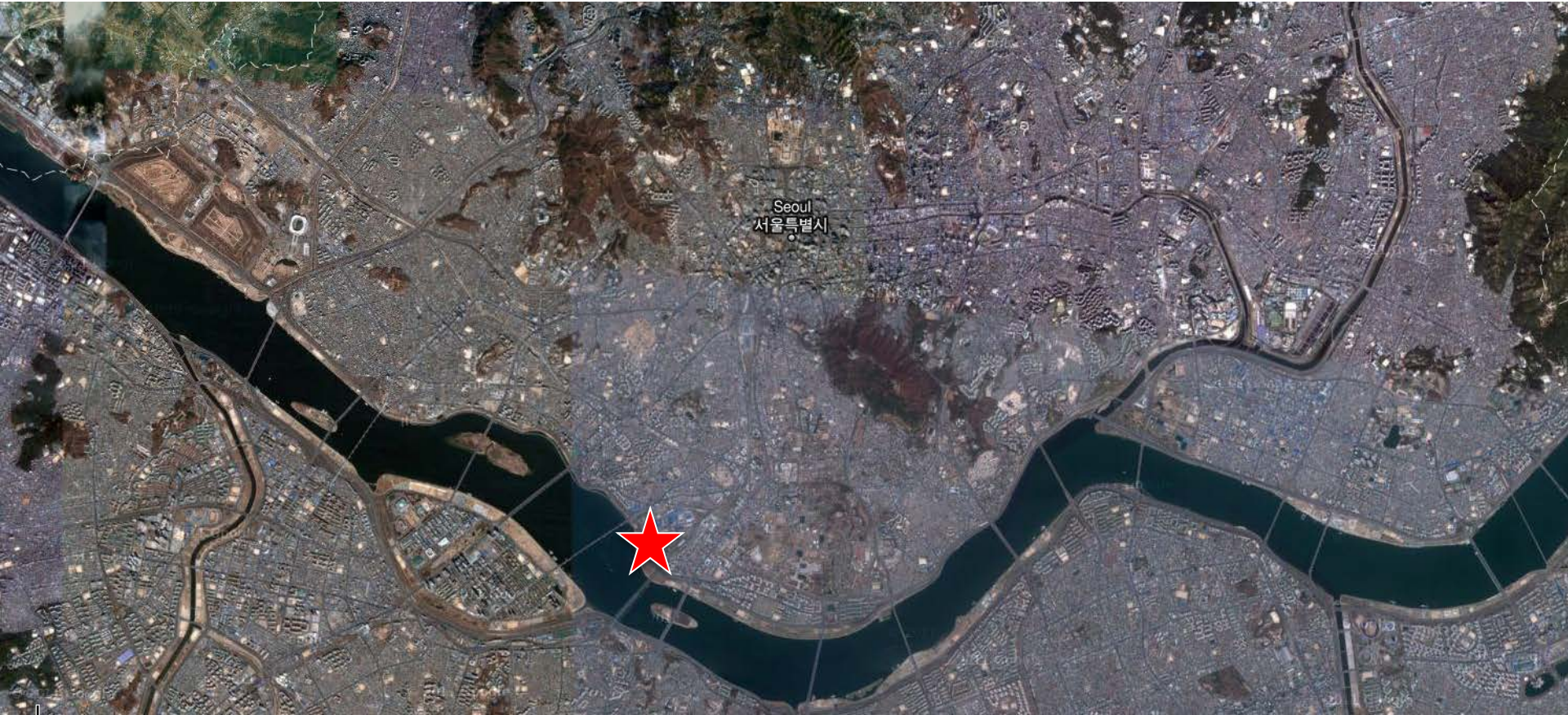
City: Los Angeles, USA



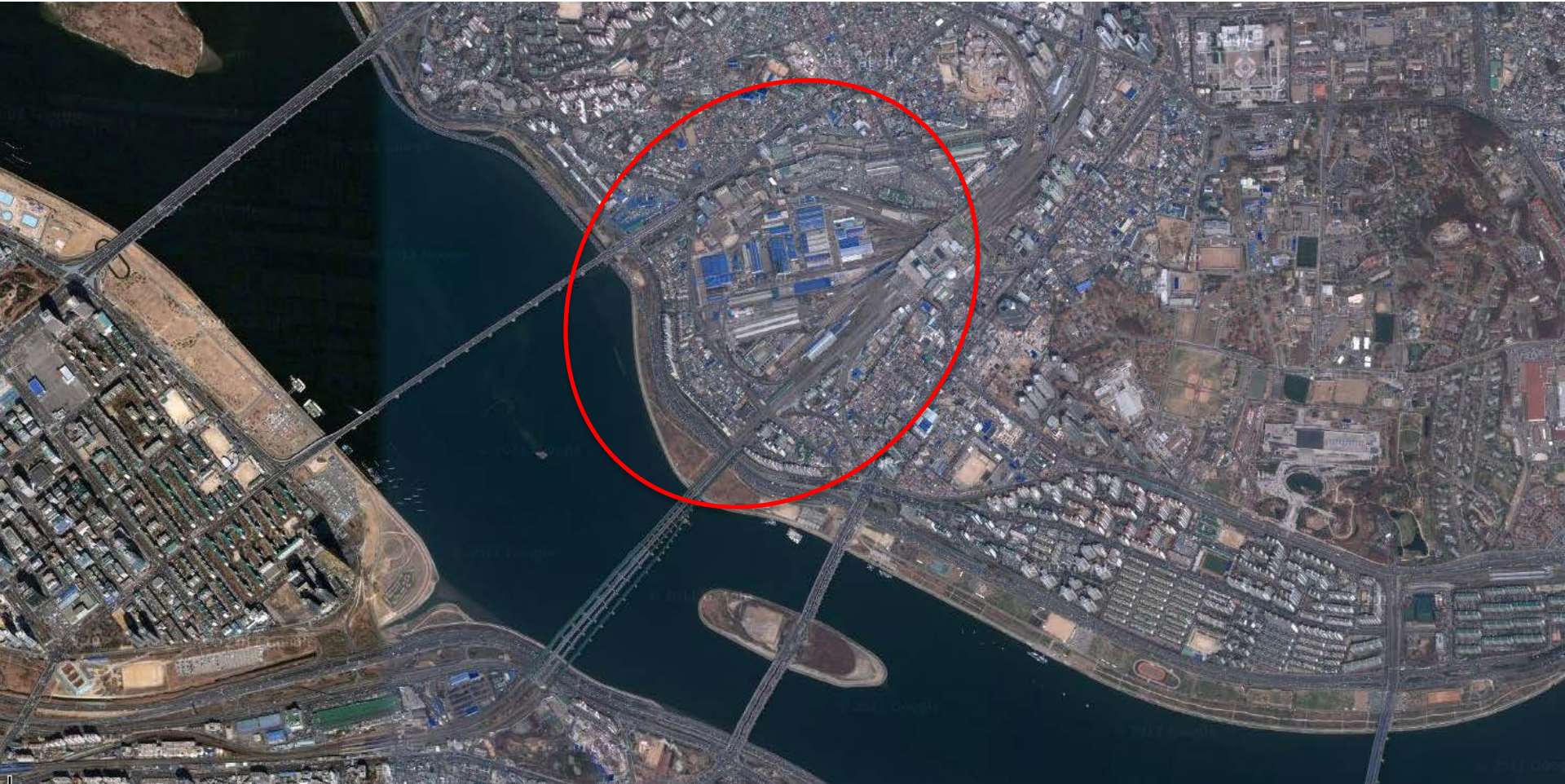
Site Case Study

Yongsan International Business District (IBD)

Site Context

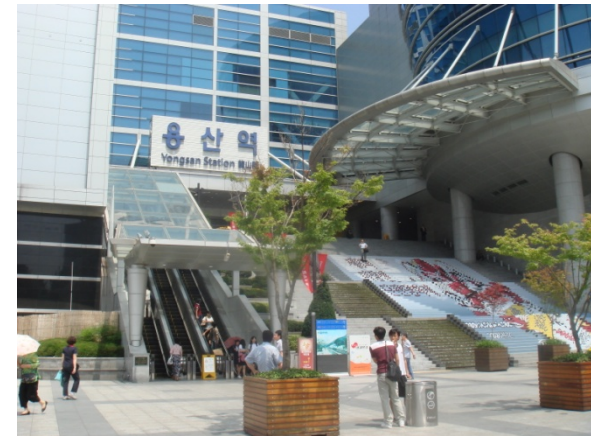


Site Context



Background – Yongsan IBD

- **Central Seoul**
- **Convergence of regional and national railways**
- **Hemmed in by infrastructure**
- **Emergent Transit-oriented community**
- **Waterfront connections including bikeway**
- **Challenge: create sustainable transportation vision while recognizing car use**



Yongsan Sustainability Goals

Generate a comfortable environment for residents and visitors



Minimize energy use and its impact on the environment



Design a City resilient to climate change



Foster a vibrant local economy



Establish a connective transportation plan emphasizing walking, cycling, and clean mass transit services



Create a strong sense of community integrating culture and heritage



Minimize the embodied impact of materials



Minimize water use and its impact on the environment



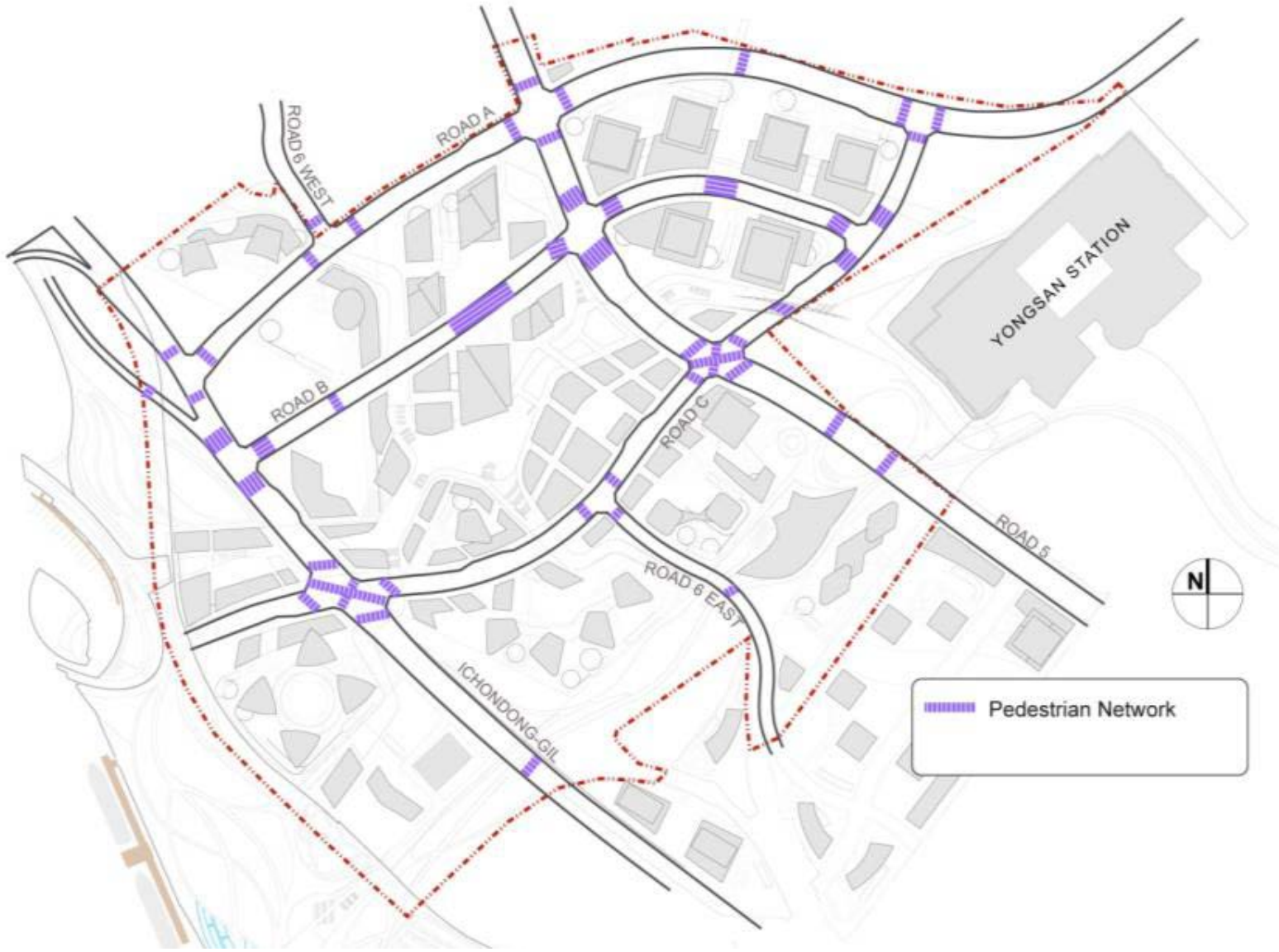
Minimize generation of waste and disposal of waste to the landfill/incinerator



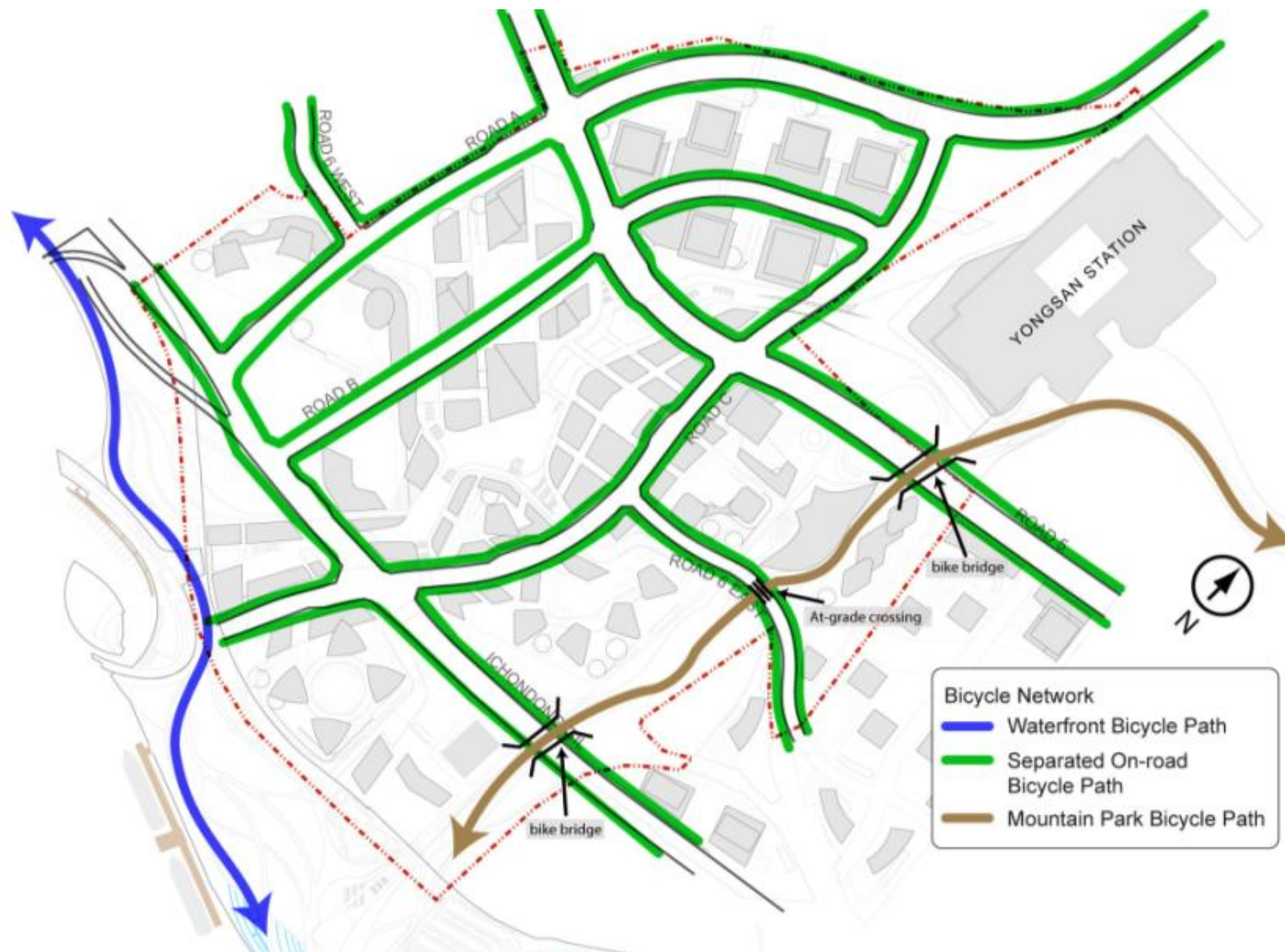
Yongsan IBD



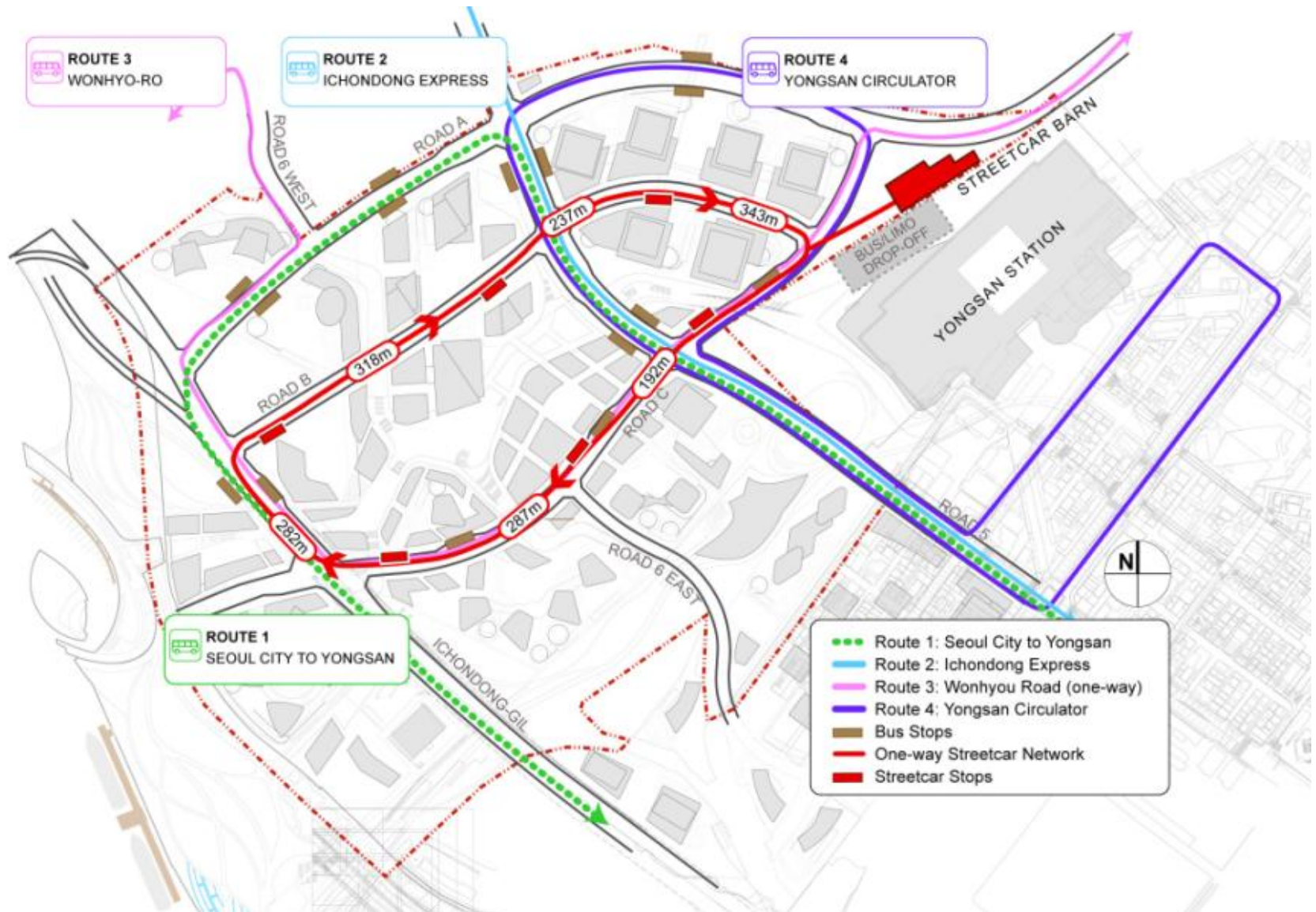
Pedestrian Network



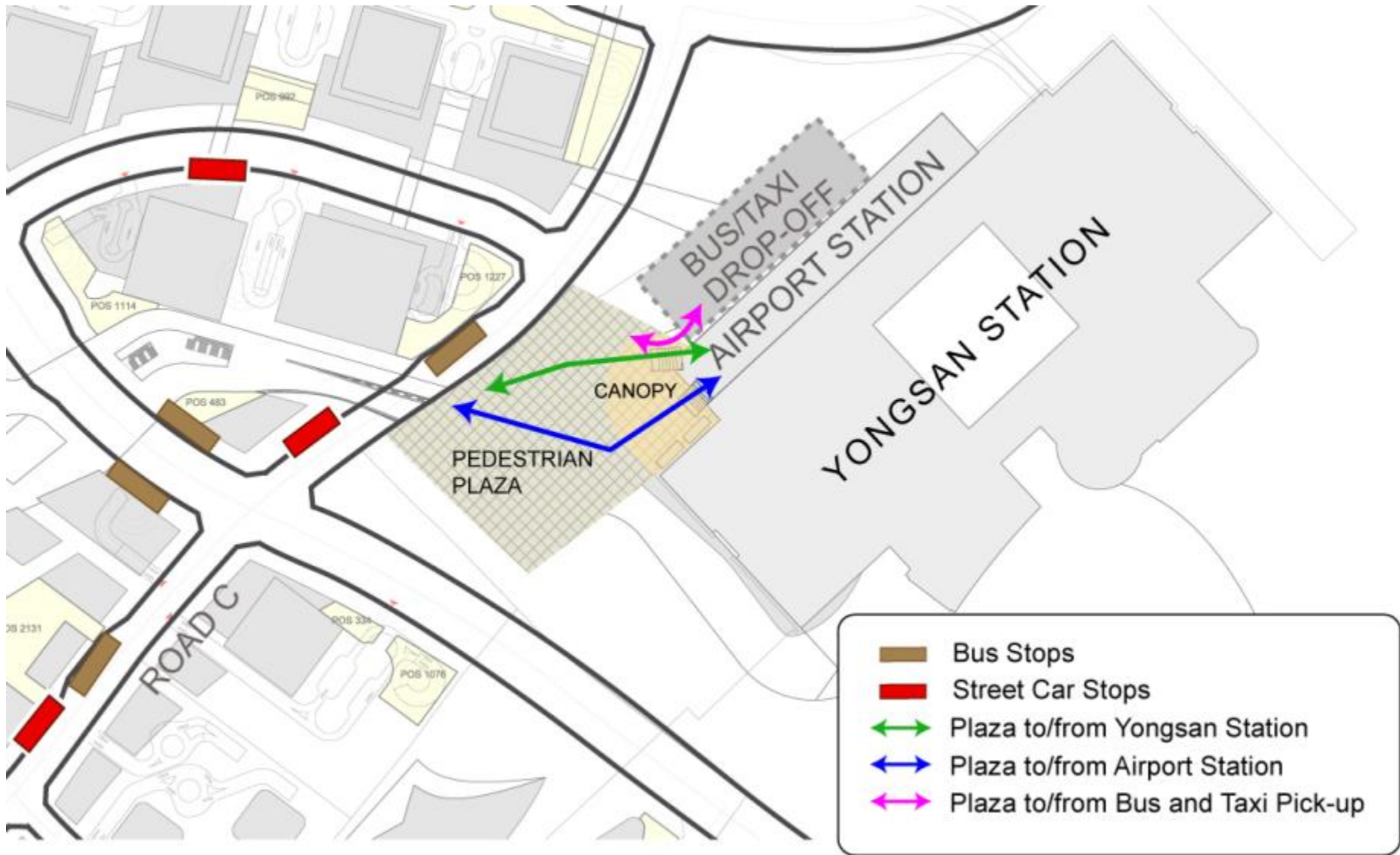
Bicycle Network



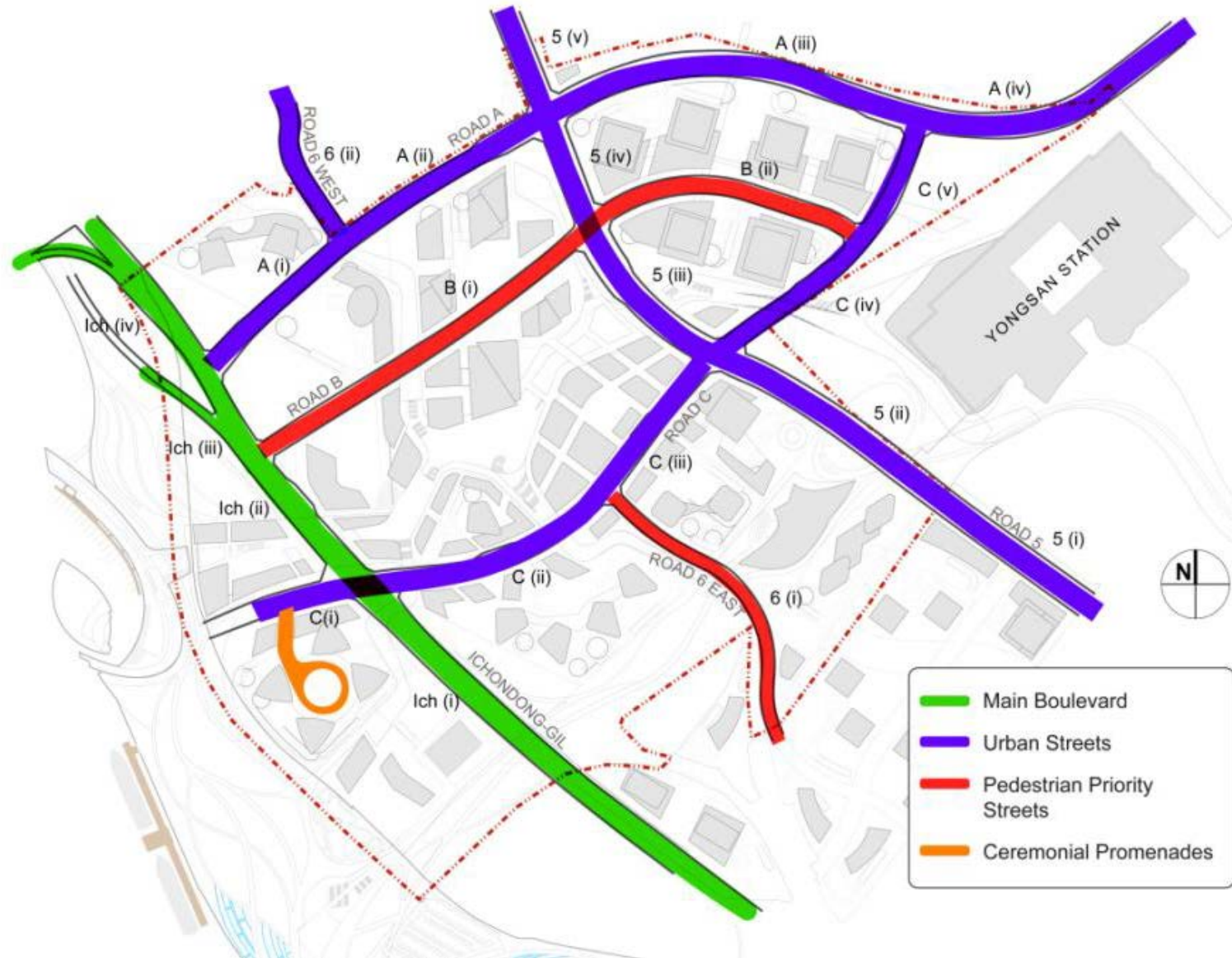
Public Transit Network



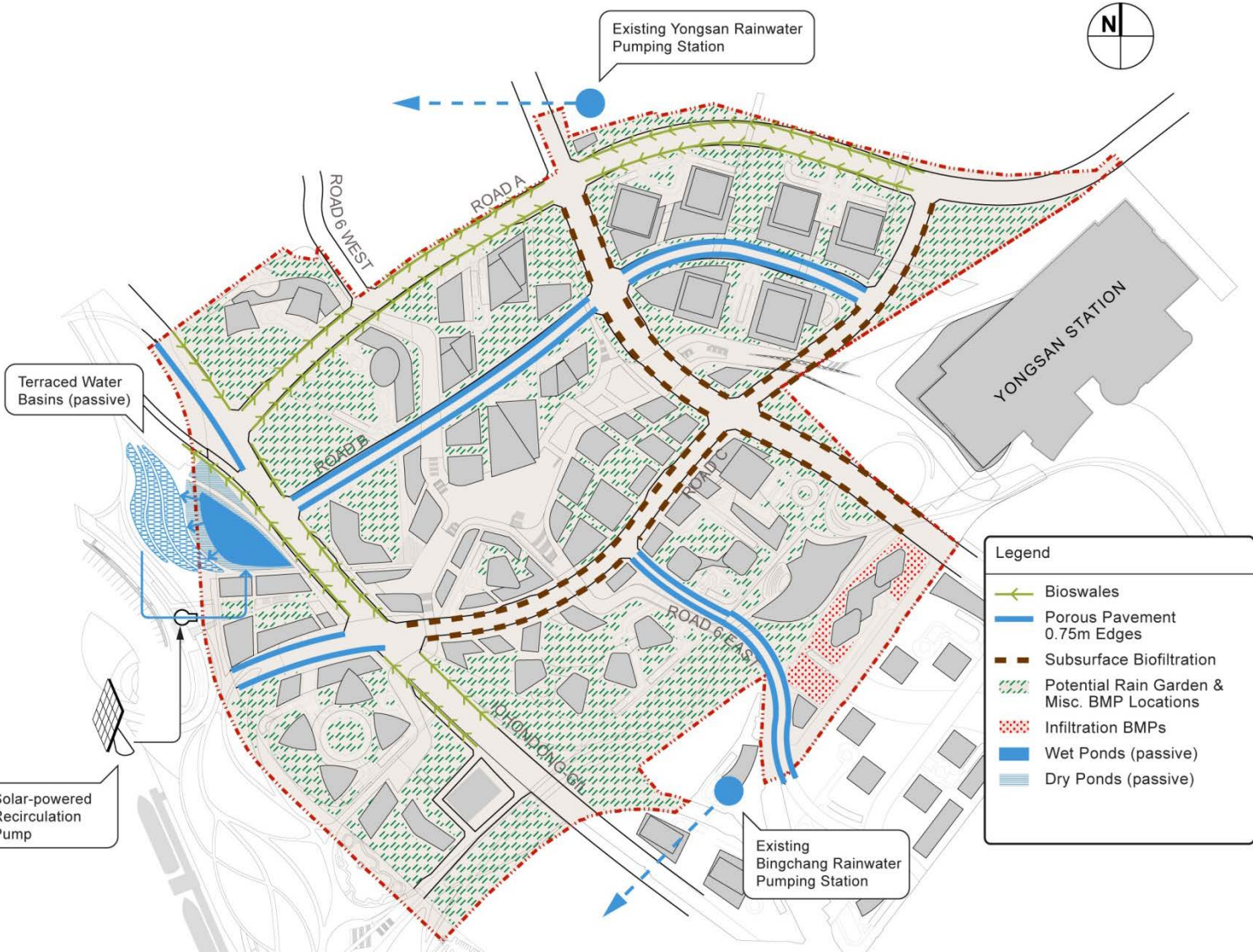
Airport Station Location and Access



Yongsan Street Typologies



Stormwater Management Plan



Yongsan IBD





District Case Study: Manhattan A Greener, Greater New York, NY

Existing Infrastructure



Existing Infrastructure



Reallocation of Road Space



New Transportation Infrastructure: Bike Lanes



9th Avenue



Bleeker Street

Reinvention of roads: Park space

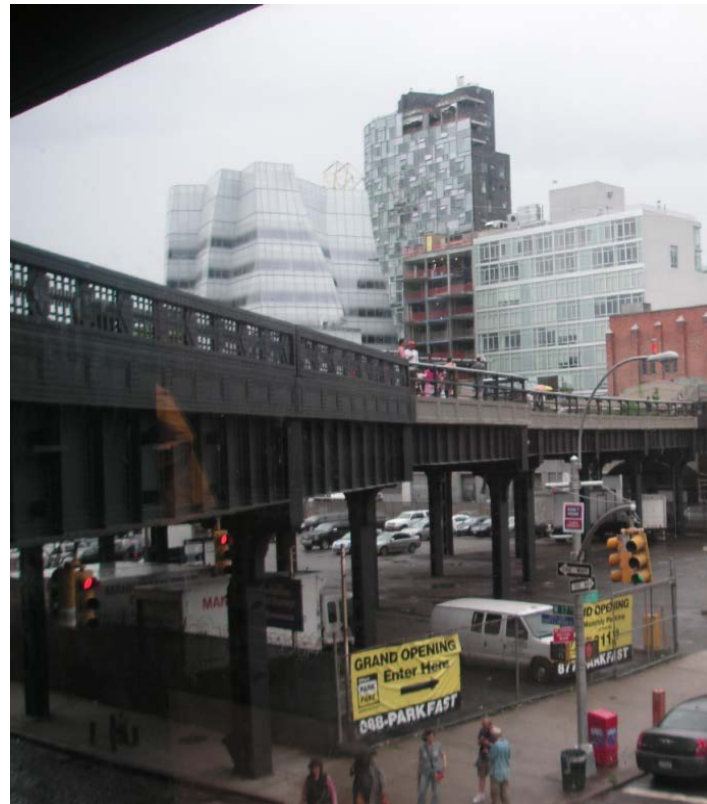


Herald Square



14th Street and 9th Ave

Repurposing Old Infrastructure: High Line



Curb Management

■ Develop a curb management framework

- Identify and prioritize user needs
- Case studies and strategies
- Testing & Pilot
- Stakeholder Outreach



Residential Street	Activity Street	Support Street	Access Street	Through Street
EXAMPLE STREETS MONROE ST 	PARK PLACE 	FRONT STREET 	CHURCH STREET 	CANAL STREET
-Prioritize pedestrian activity -Maximize resident parking opportunities -Consider the need for deliveries	-Core areas of neighborhoods -Where pedestrians access work, shops, transit, social outlets -Loading/unloading of goods/passengers	-'Back streets' of Lower Manhattan -Access to loading docks, off-street parking -Site geometry can be a limiting factor	-Access to/from major destinations -Commercial/office uses of all scales -High traffic capacity	-Access through Lower Manhattan -Traffic movement takes priority -Keeps through vehicles off activity streets -Some commercial loading occurs
CURB USERS Commercial Vehicles Residents	Commercial Vehicles Residents Shoppers/Visitors	Commercial Vehicles Government Employees Intercity Buses	Commercial Vehicles Government Employees Intercity Buses Shoppers/Visitors	Commercial Vehicles Intercity Buses
CURB USES 	 	 	 	

Shared Streets

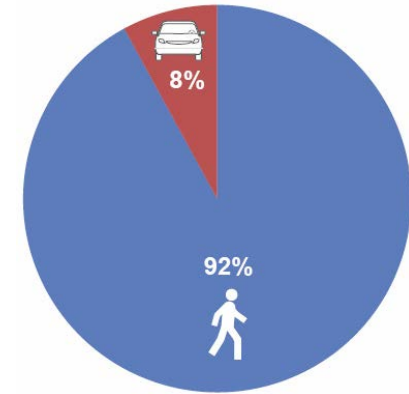
■ What

Allows all users – pedestrians, cyclists and vehicles – to move within the same space.

■ Where

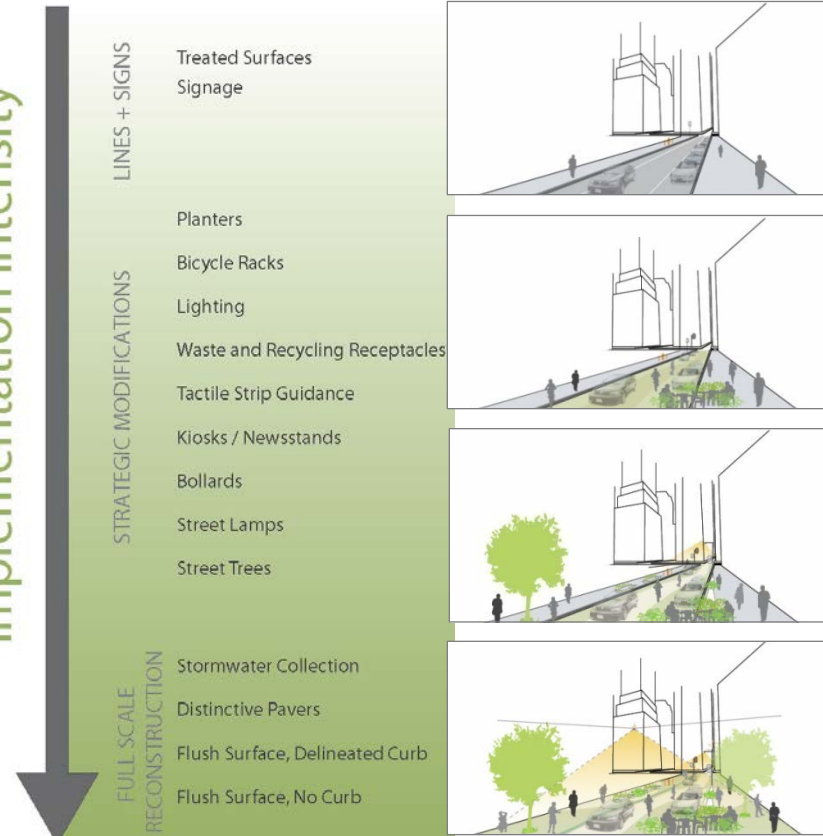


■ Why



■ How

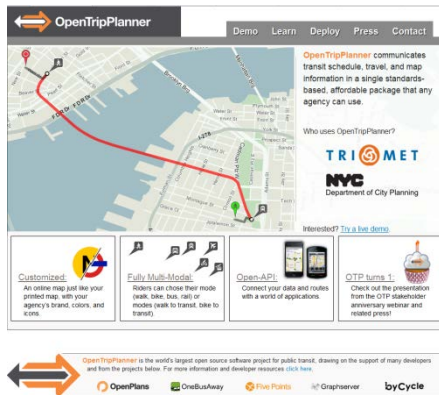
Implementation Intensity



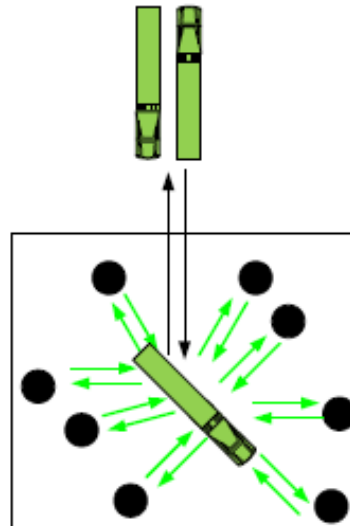
Delivery Management

■ Strategies and Pilot Program for Efficient Goods Movement

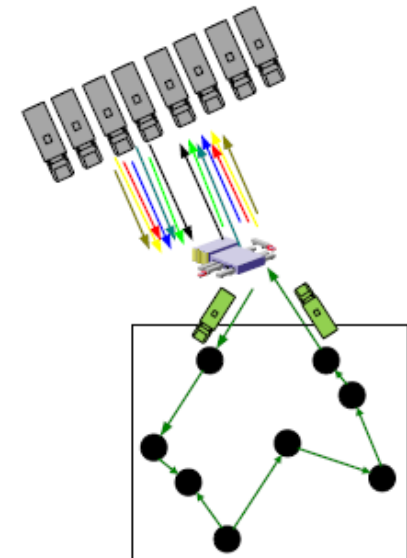
- Existing conditions (safety, quality of life, etc.)
- Lessons Learned, Case studies and strategies
- 3 Proofs of concept
- Design Guidelines for consolidation center



Commercial Vehicle
Trip Planning



Last Mile Logistics
Platform

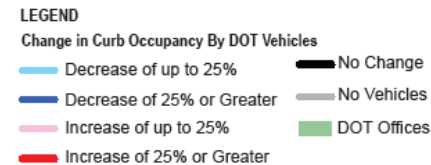


LM Consolidation
Center

DOT Car Sharing Pilot Utilization

■ Analysis of NYCDOT Pilot Program

- On-Street Parking Demand
- Vehicle Usage
- Employee Feedback
- Agency Costs





Real-time Transit Information





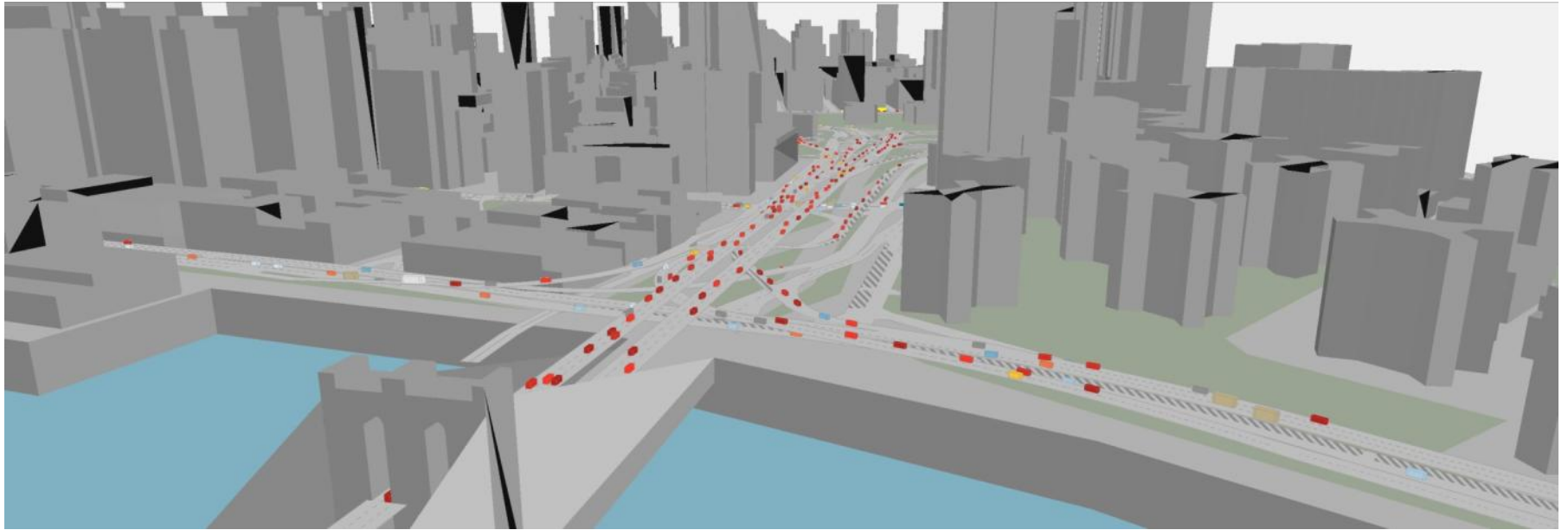
Smart Parking Guidance Systems





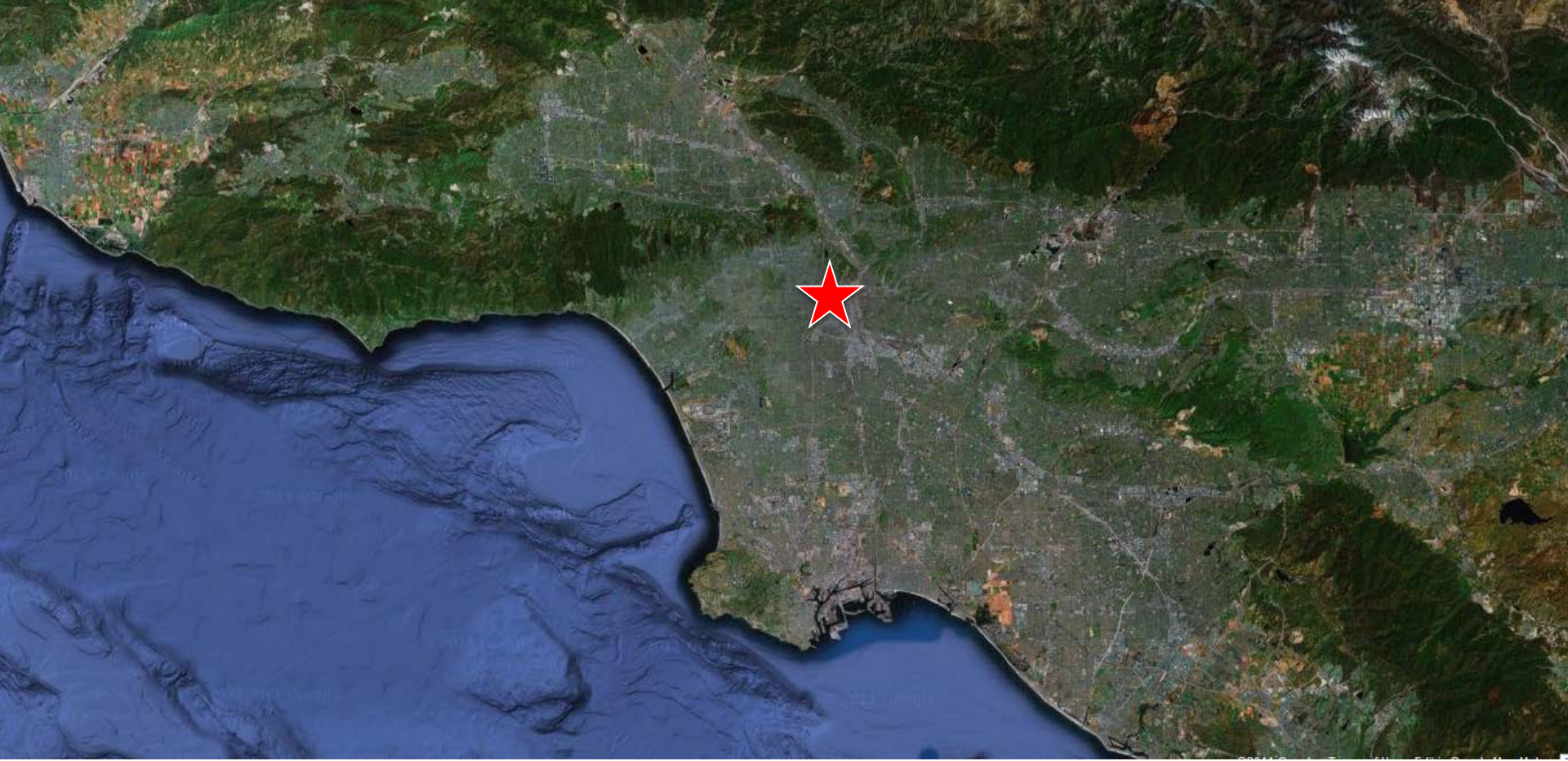
Network Plans: Lower Manhattan Street Management

Lower Manhattan Street Management Model

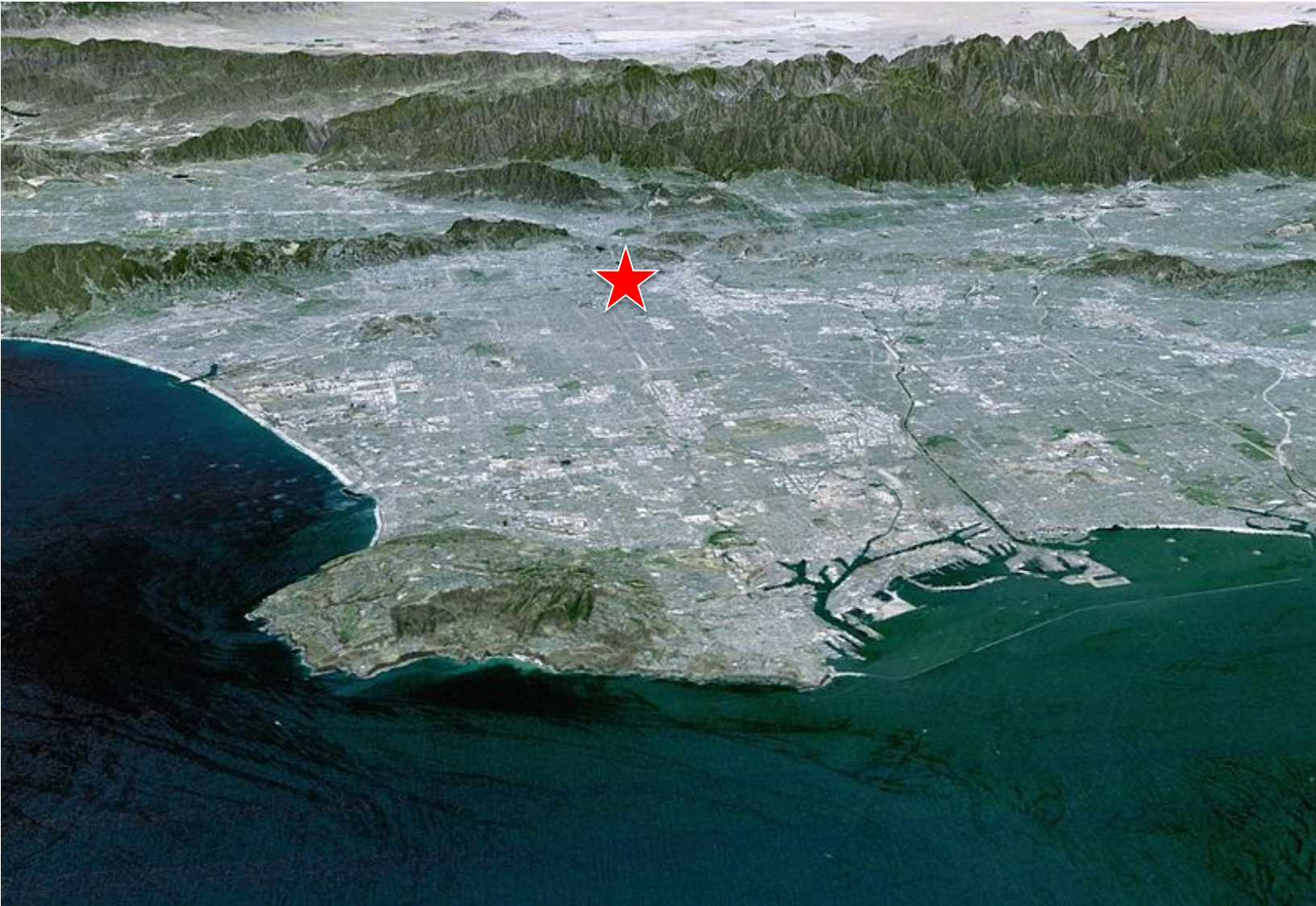


City Case Study: Los Angeles, USA

Regional Context



Los Angeles Basin



Source: NASA

Background

- **1,300 sq km**
- **City pop: 3.8 million people**
- **Metro area pop: 15 million**
- **Served by extensive network of highways**
- **Subway, LRT, commuter rail, and many bus lines**
 - ~2 million daily ridership
- **Challenge: Provide more sustainable transportation choices**



Metro Rapid



Metro Rapid Network



Santa Monica Blvd Bike Lane



[Report a problem](#)

Source: Google Maps

HOV Network



Intelligent Transportation Systems (ITS)



Source: Pbase.com; jaragaki

Freeway Service Patrol



Source: Flickr; Metro – Los Angeles

Gold Line TOD – Lincoln/Cypress Station



Source: Bing Maps

30/10 Initiative

- **30 years' worth of projects in 10 years**
- **Bonding using sales tax as collateral**
- **160,000 new jobs**
- **Annual benefits:**
 - 77 mil more transit boardings
 - 10 mil fewer gallons of gasoline used
 - 191 mil fewer vehicle miles traveled



Source: Flickr Creative Commons, prayitno

3rd Street Promenade





*“Make no little plans. They have no magic to stir men’s blood....
Make big plans; aim high in hope and work.”
- Daniel Burnham*

Thank You!